

REVIEW AND WAR-PLANNING NUMBER

FEBRUARY 1942

Coal Age

McGraw-Hill Publishing Company, Inc. • THIRTY-FIVE CENTS PER COPY

THE ECONOMIC FRONT
In Coal's War-Planning Program

•
COAL-MINE PRESIDENTS
Look at the Problems Coming Up

•
ANTHRACITE MOVES UP
In Mining and Preparation Work

•
MORE MECHANICAL AIDS
Boost Bituminous War Capacity

•
ALL-TIME SAFETY MARK
Set by Coal Industry in 1941

•
BITUMINOUS STRIPPINGS
Install More and Larger Units

•
POWER AND MAINTENANCE
And Their Role in War Operation

•
Complete Table of Contents, P. 5



Washington Press Photo

Leading vital mine priorities work—Administrator Wilbur A. Nelson

Less Power Drag . . . More Pay Load!



SUN MINE LUBRICANTS

Added 3 Cars per Haul . . . Made Possible a Higher **P-Q***

More full cars moving toward the shaft . . . less time out for repairs and maintenance of equipment — that's the demand today. And that was the result obtained when a large Pennsylvania mine switched to SUN Mine Car Grease for all of its cars:

- MAINTENANCE TIME WAS CUT MATERIALLY
- 3 EXTRA CARS WERE ADDED TO EACH HAUL
- WHEEL REPLACEMENTS WERE REDUCED 22%
- 18% LESS LUBRICANT WAS REQUIRED

Little wonder the operator of this mine was

able to step up the P-Q*! Other leading mine operators, too, have learned to rely on SUN Mine Lubricants to help obtain peak production . . . reduce power drag . . . and cut maintenance costs.

If you're interested in setting a higher P-Q* for your mine, now's the time to call in a SUN Oil Engineer. Let him demonstrate how the right petroleum product in the right place can give a real boost to production. Just write SUN OIL COMPANY, Philadelphia, Pa.

* PRODUCTION QUOTA



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SUN Pressure Grease
SUN Compressor Oils
SUN Journal Oils
SUN Mine Car Lubricants
SUN Ball & Roller
Bearing Greases

also

COALKOTE for Dustproofing

SUN PETROLEUM PRODUCTS

SUNOCO

HELPING INDUSTRY HELP AMERICA



Machines that grow more rubber than nine million trees

A typical example of Goodrich product development

MACHINES like that in the picture will soon become the world's largest rubber plantation—they will give America 34,000,000 more pounds of rubber a year for defense needs—more than could be produced in a year by 9,000,000 rubber trees.

For many products, rubber reclaimed from used tires is even better than the raw product. But wires are imbedded in the tire rim so firmly there has been no way to get them out. So, in reclaiming, the rim section was cut off and wasted, the rubber burned.

A few years ago Goodrich engineers, anticipating the defense need for rubber, set out to stop that waste. After experiments they finally developed the machine in the picture. It slits the rubber down to the wire, all the way around the piece of tire formerly wasted. Then, while the rubber is evenly held by the machine, sharp mechanical fingers reach in, grip the wire, pull it in just the right direction to produce a shearing action, and strip it away from the rubber. The rubber formerly burned is all saved.

In this emergency, B. F. Goodrich

has arranged to make the machine available to all rubber reclaiming companies, and from the tires they reclaim every year it can add 34,000,000 pounds to America's vital rubber supply.

Here is a perfect illustration of B. F. Goodrich research. It is constantly at work not only to improve rubber products themselves but also to improve the equipment for making and using rubber—in time of peace or war. The B. F. Goodrich Co., Industrial Products Division, Akron, Ohio.

B.F. Goodrich
First IN RUBBER

NOT ALL DEFENSE DRUMS



The famous red, white and blue drum of Hulburt Quality Grease is often seen — but never heard. It wages a silent, continuous defense action against friction and deterioration in coal mine equipment. The grease in a Hulburt Quality drum serves in speeding production, eliminating break-downs and reducing maintenance costs. It is the only grease made exclusively for coal mine equipment. Write us for your down-in-the-mine survey — by an experienced Hulburt Lubrication Engineer.

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PHILADELPHIA . . . PENNSYLVANIA

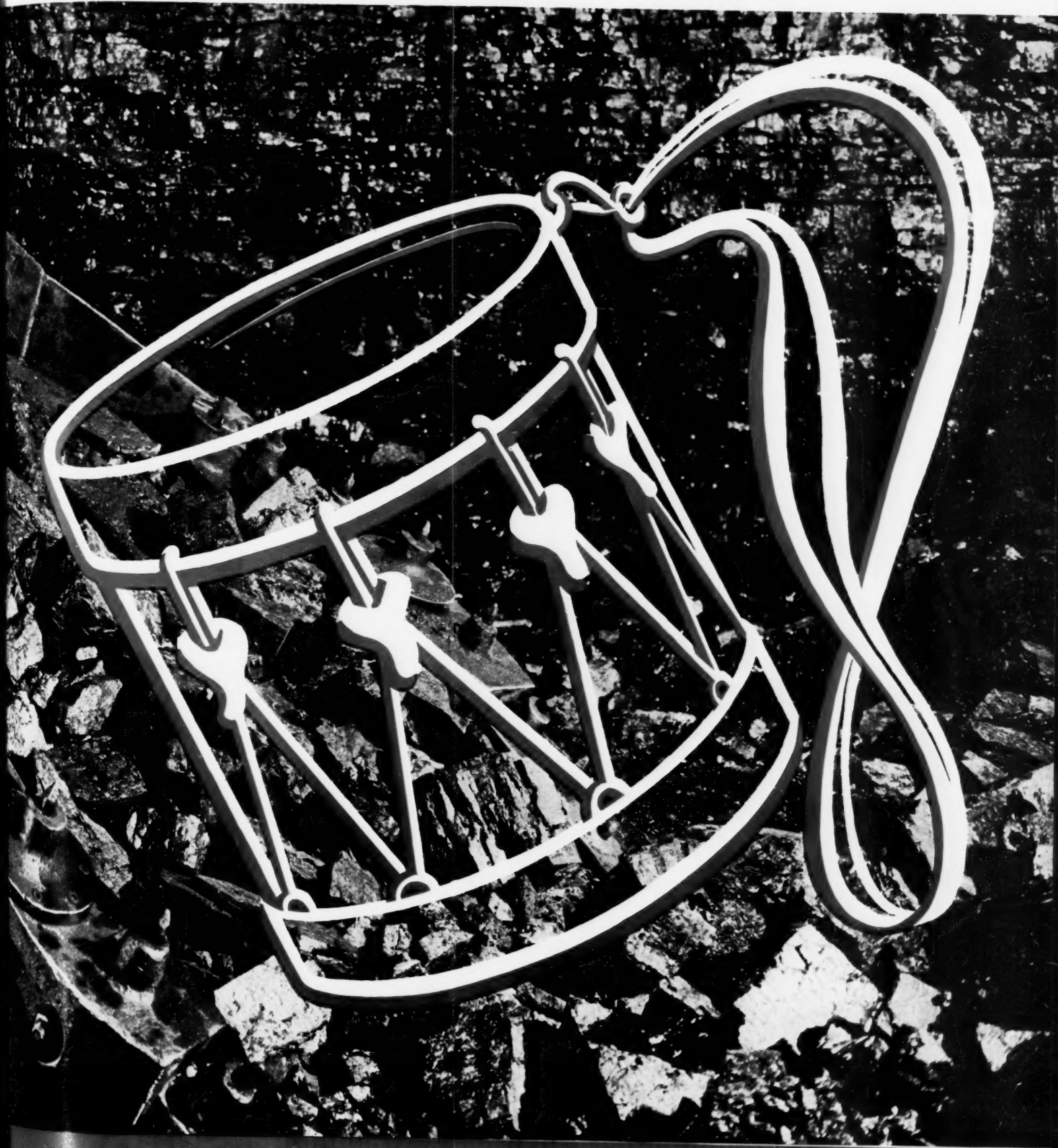


Hulburt Lubrication Engineers are available at all times for a down-in-the-mine survey without obligation. Write us today.



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QUALITY GREASE

*You can
haul 10%
more coal
at no extra cost
with*

PHILCO BATTERIES

in your JOY Shuttle Cars



PHILCO, Storage Battery Division ★ Trenton, New Jersey

The year 1941 was an active one for the coal industry of the United States. Under the influence of the defense—now war—effort, bituminous coal production rose 10.9 percent, while anthracite marked up a 5.6-percent gain. Factors responsible for these gains, as well as other developments on the economic front, are summarized starting on p. 50. . . . The outbreak of the war at the end of the year, however, intensified a number of existing problems and brought several new ones to the fore. Consequently, an outstanding feature of this issue are telegraphic opinions on the problems of the future by a selected list of coal-mine presidents. Pithy and illuminating, these opinions are presented on pp. 50-55. . . . New gains in the use of mechanical mining and preparation equipment were another major development in coal mining in 1941. What these gains meant in terms of sales and application of equipment are summarized in articles on pp. 60, 66 and 71, with an analysis of bituminous stripping developments on p. 69.

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Coal Age

Volume 47

Number 2

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RETURN METAL DRUMS PROMPTLY... thus helping to make present supply meet industry's needs and releasing metal for National Defense.

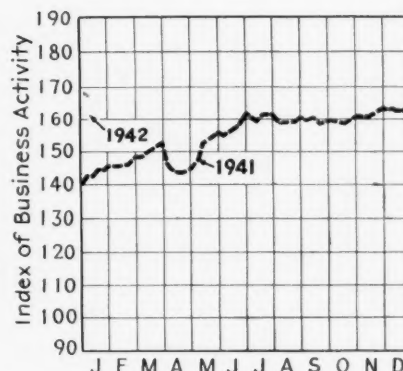
(CONTINUED FROM PAGE 5)

Carrying out the war-planning theme, each review is accompanied by a number of suggestions for increasing output and raising efficiency. . . . **Power** for operation and prevention of delays and breakdowns are equally if not more important than the equipment itself. How electrical distribution practices may be improved and machines may be kept in shape for the more continuous operation and higher efficiency necessary for the war effort therefore is the subject of articles starting on pp. 74 (power) and 78 (maintenance), with supplies sandwiched between on p. 77. . . . **Future issues**, in line with this important principle, will present an increased volume of material bearing on maintenance, with a number of suggestions dealing with things which might be done to simplify the problem. Among the specific items on the agenda is a description of methods and equipment at a new underground shop at No. 93 mechanical mine of the Consolidation Coal Co. . . . **Mechanical loading**, stripping and preparation developments also to be highlighted in coming issues include mining barrier pillars at Pittsburgh Terminal No. 8, in Pennsylvania, with shaker conveyors; big cars and transfer hoppers behind loaders at Peerless mine in Indiana; and revisions in stripping practices and equipment at Fidelity No. 11, in Illinois, including a new shovel, conversion of an old shovel to a dragline and adoption of truck haulage.

HOW'S BUSINESS

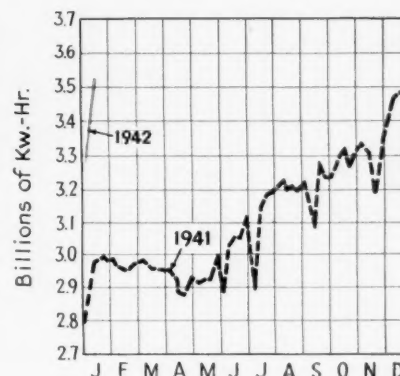
GENERAL BUSINESS CONDITIONS

Donald M. Nelson takes charge of the war production set-up with business activity practically at peak levels. In almost every way, the country has reached new highs. Even prices, which were lagging behind production, have edged up to within striking distance of 1929 levels. *Business Week* Index (preliminary) for Jan. 10 stood at 163.4, compared with 164.2 (revised) a month earlier and 143.0 a year ago.



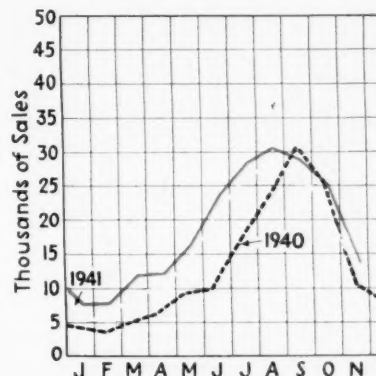
ELECTRIC POWER OUTPUT

Output of energy by the electric light and power industry for the week ended Jan. 10—3,480,344,000 kw.-hr.—showed a normal increase over the preceding week by comparison with the previous two years. The trend of output until mid-April will be significant in view of the relationship between use of utility capacity and output of war materials. Output for recent weeks, according to the Edison Electric Institute, was: Dec. 20, 3,495,000,000 kw.-hr.; Dec. 27, 3,234,000,000; Jan. 3, 3,289,000,000 kw.-hr.



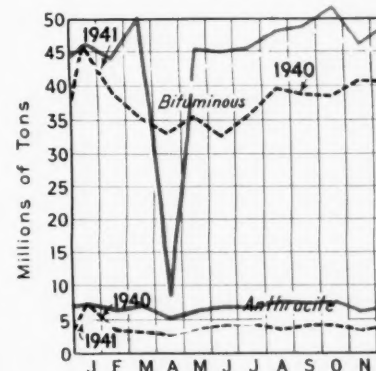
COAL STOKER SALES

Mechanical stoker sales in the United States in November last totaled 10,877 units (U. S. Bureau of the Census from 101 manufacturers), compared with 23,289 in the preceding month and 11,017 (revised) in November, 1940. Sales of small units in November last were: Class 1 (under 61 lb. of coal per hour), 9,428 (bituminous, 8,042; anthracite, 1,386); Class 2 (61-100 lb. per hour), 623 (bituminous, 574; anthracite, 49); Class 3 (101-300 lb. per hour), 562.



COAL PRODUCTION

Bituminous coal produced by United States coal mines in December last (preliminary) totaled 46,667,000 net tons, according to the Bituminous Coal Division, U. S. Department of the Interior. This compares with 43,770,000 tons (revised) in the preceding month and 41,400,000 in December, 1940. Anthracite tonnage in December last, according to the U. S. Bureau of Mines (preliminary), was 4,106,000, against 3,832,000 (revised) in the preceding month and 4,834,000 in December, 1940.





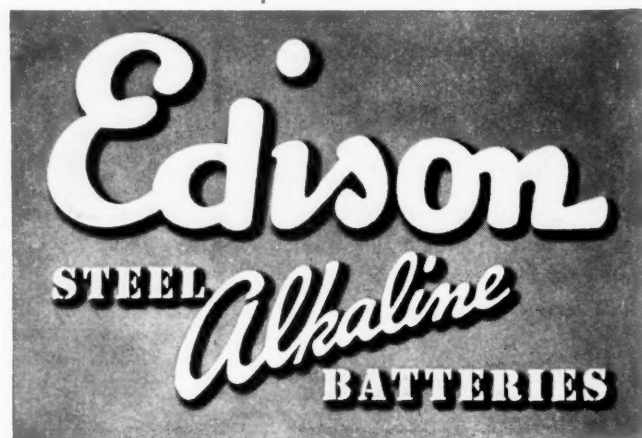
Illustrated above is an operation in the manufacture of an Edison Storage Battery, the slitting of steel strip which will shortly be made into perforated tubes and pockets in which the active materials will be packed.

★ Note first that these parts, like all other structural parts of the cell, are of steel; and second that their purpose is to *retain* the active materials in the plates. This prevents shedding of active materials.

★ These and other manufacturing operations are interestingly illustrated and described in a 44-page monograph which will be mailed on request to any reader of this magazine who is concerned with the operation of shuttle cars, and wants to investigate the subject of more durable, dependable and

economical storage batteries for their use.

★ Why Edison Batteries best withstand rough usage, why they have a life two to five times longer than others, why they are free from usual battery troubles, why they cost less to operate—the underlying reasons for these and other facts are given in this monograph. Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J., U. S. A.





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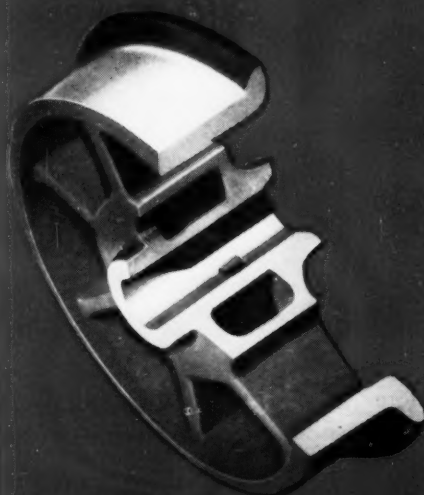
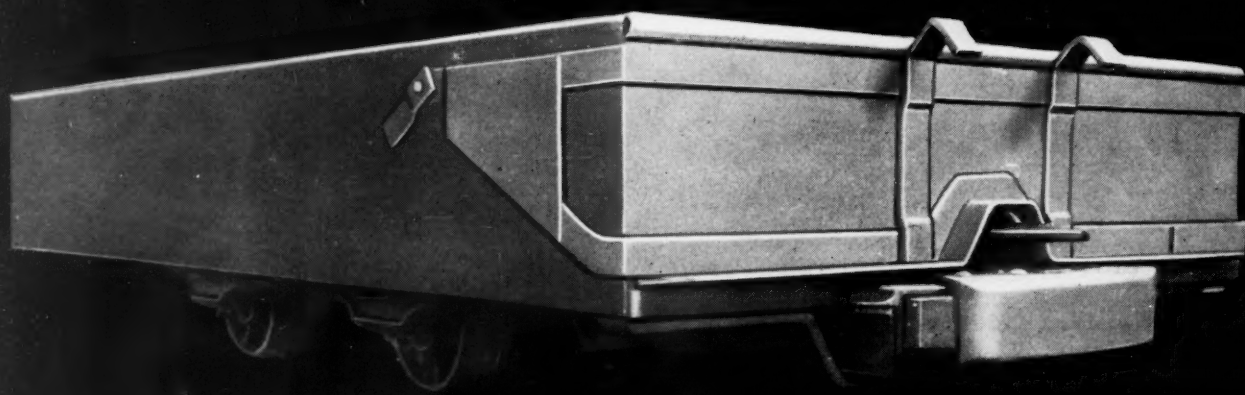
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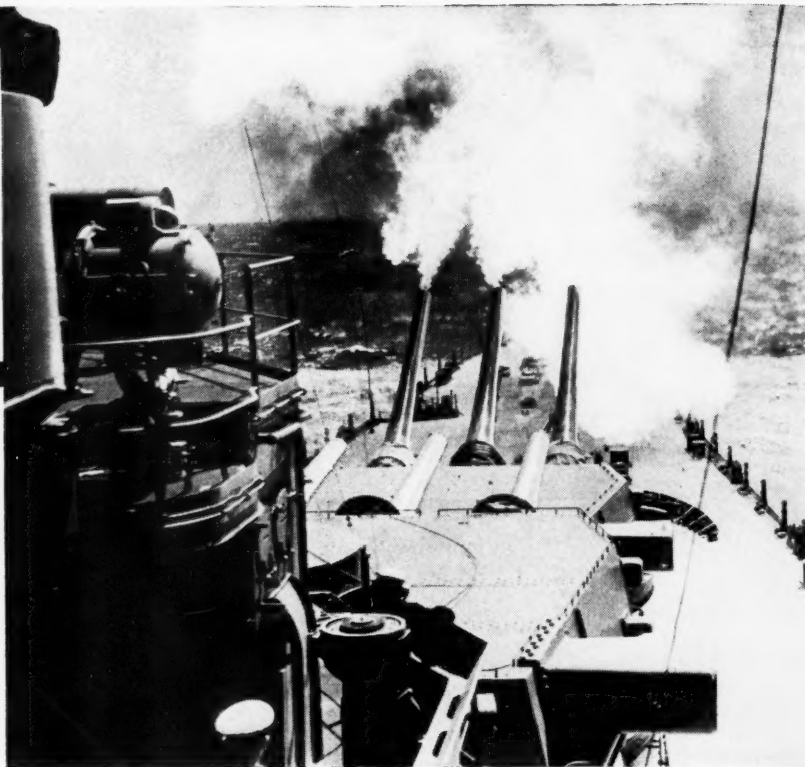
WAR PRODUCTION

tolerates no slow-downs. Don't allow inadequate lubrication to reduce engine efficiency. For *STEAM ENGINES* there are . . .

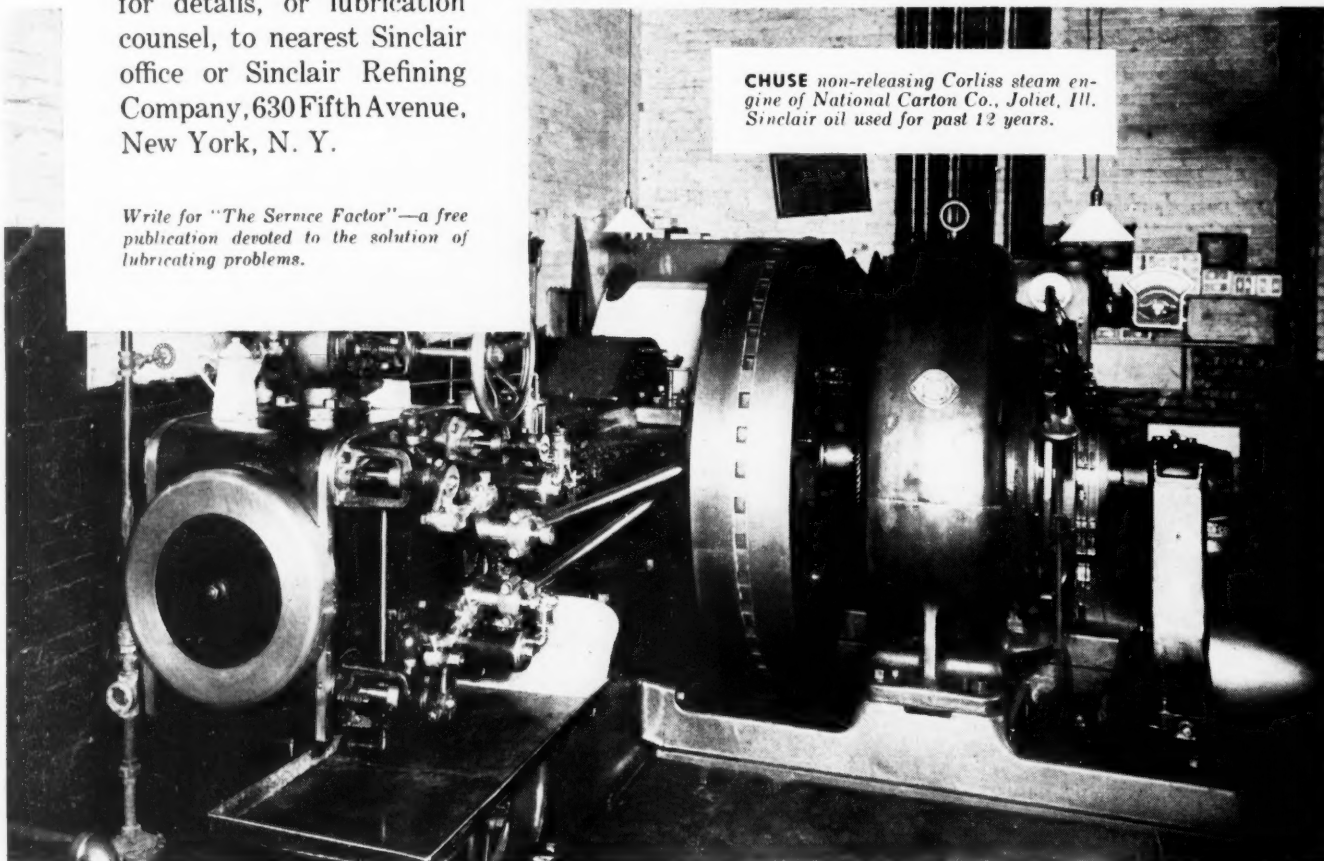
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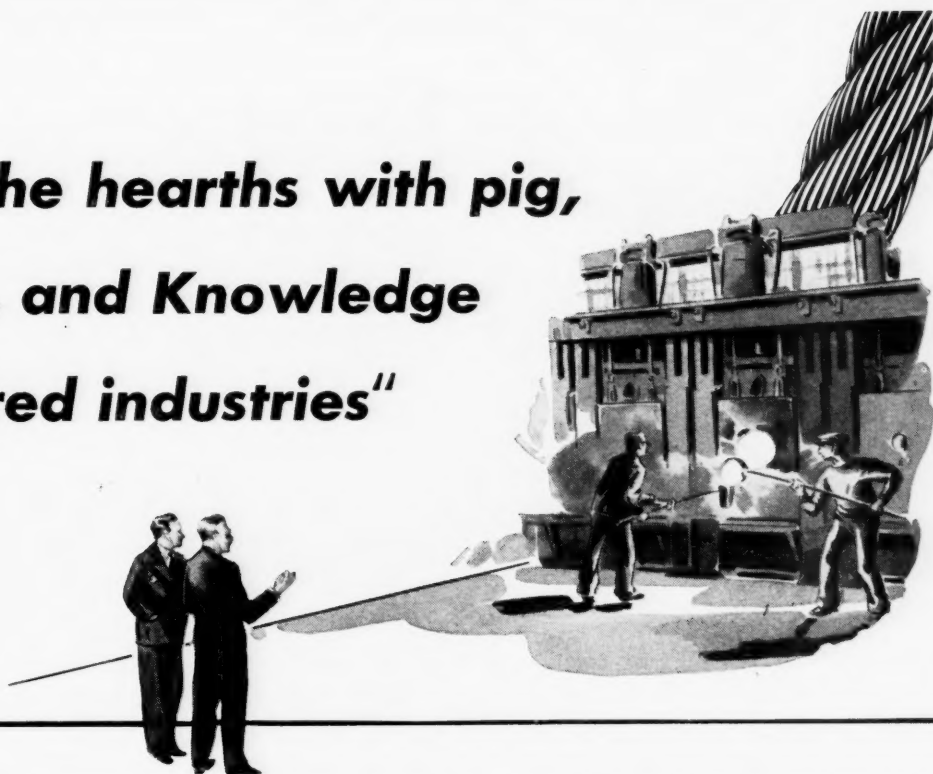
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and scrap, and Knowledge
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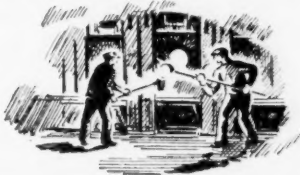
"It's fired for many hours before it's ready to pour, and during the better part of two shifts you put into it many things. Some are ingredients that anyone can use in open hearth steel. And some are not . . .

As the empty hearth begins to glow, you lay your silica bottom. You're making "Blue Center" steel, and it calls for purer raw materials. Good pig, selected scrap and plate.



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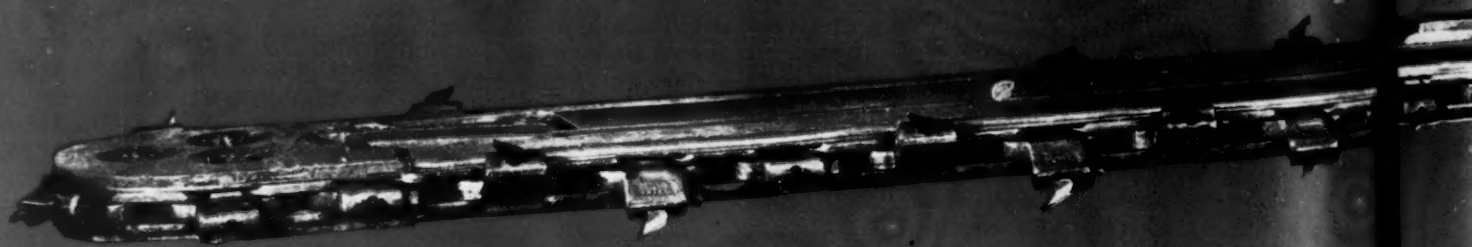
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demand COAL and
METALS. Thousands
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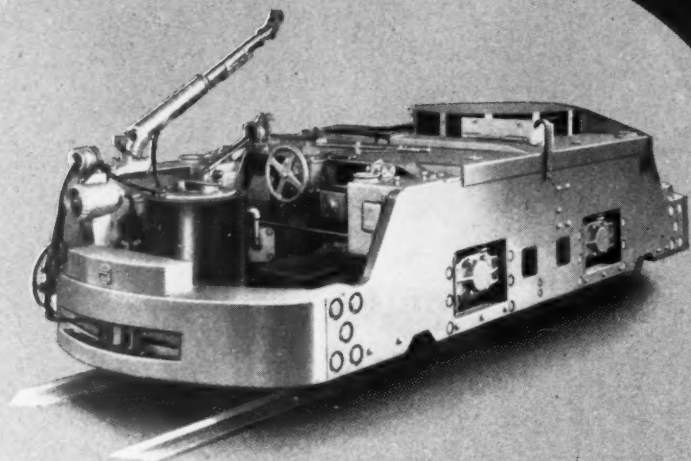
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complete details.

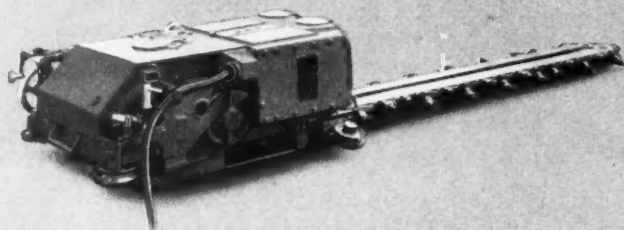
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Jeffrey 8-ton Cable Reel Locomotive
(explosion-tested type)



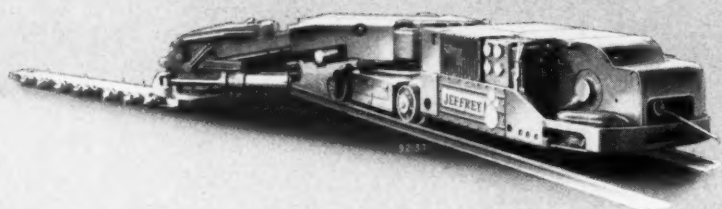
Jeffrey 12,000 lb. chassis storage battery Locomotive
(permissible type)



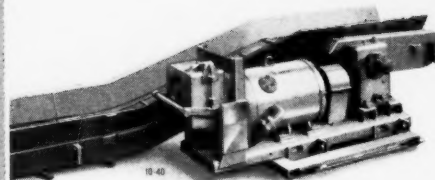
Jeffrey 35-BC Conveyor Shortwall coal cutter
(permissible type)



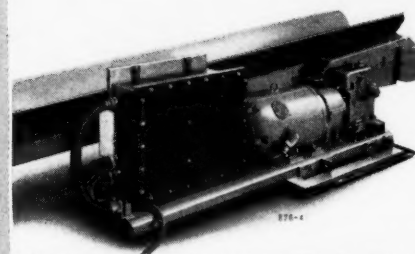
Jeffrey Type 35-L Shortwall coal
cutter on self-propelled truck for low
seam operation—permissible type



Jeffrey 29-U Universal coal cutter
(permissible type)

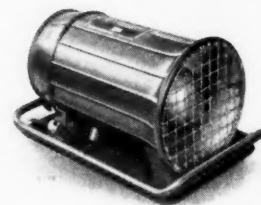


Jeffrey 61-HG Face Conveyor with
permissible power unit



Jeffrey 61-AM Room Conveyor with
permissible power unit

Other types of Jeffrey mine conveyors can
also be built with permissible starting
equipment.



Jeffrey Aerodyne Midget Blower of
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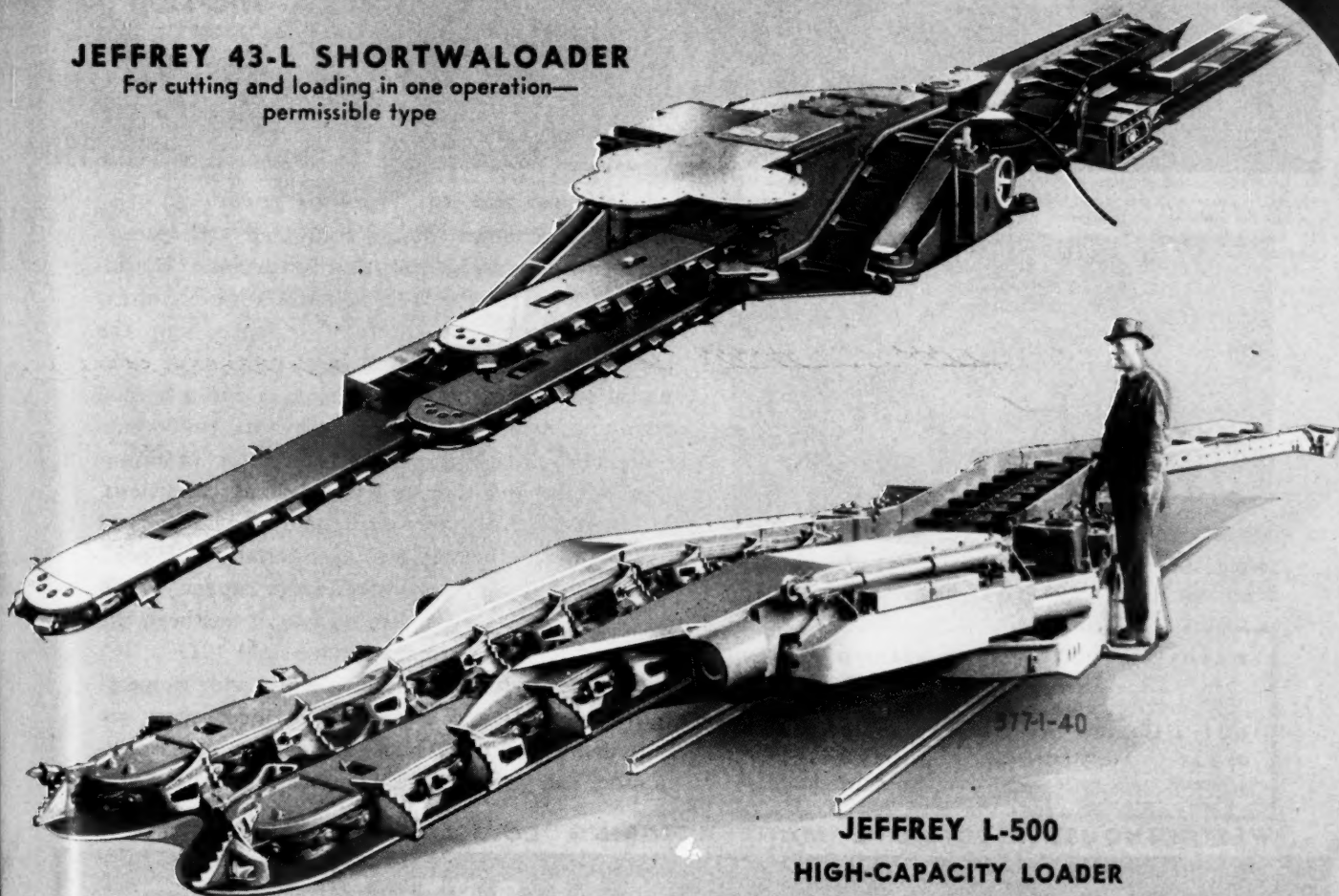
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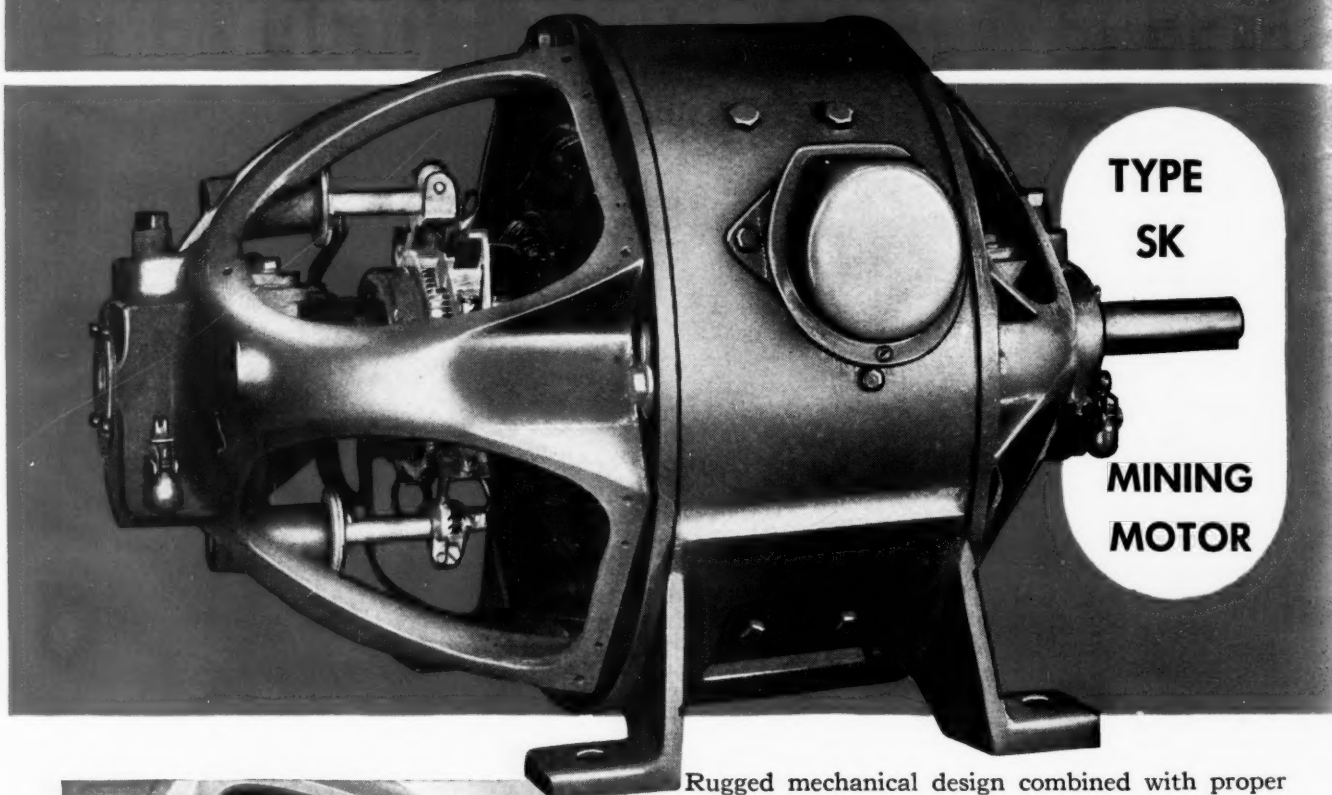
THE JEFFREY MANUFACTURING COMPANY

912-99 NORTH FOURTH STREET

COLUMBUS, OHIO

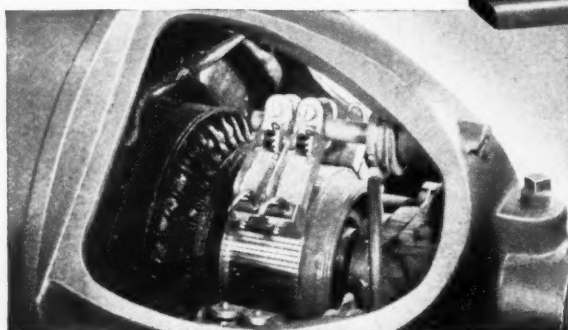
"black" commutation

UNDER SEVERE OVERLOADS



**TYPE
SK**

**MINING
MOTOR**



Insulation of finest mica and hard-drawn copper segments of generous depth assure long commutator life.

STANDARDIZATION OF "SK" WEARING PARTS CUTS COST OF REPLACEMENTS

"SK" wearing parts have been held to the same essential dimensions for 29 years. You can always count on parts for the latest design fitting every SK motor you have in service—no matter when purchased.

Rugged mechanical design combined with proper balancing and careful compensation provide "Black" commutation for the Westinghouse Type SK direct current motor. By carefully proportioning the commutating coils, using a large number of commutation bars of hard-drawn copper and a special clamping arrangement that prevents the occurrence of high bars, practically sparkless commutation is obtained for severe overload conditions. Maintenance costs are reduced and long life assured for both the brushes and commutator. "Black" commutation and the great reserve capacity built into this motor are the reasons why it has been the standard for underground service since 1911.

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WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURGH, PA.

Westinghouse SK Mining Motors



"What to Expect in 1942"

● Over six million tons of coal for 1942! This is the predicted requirement of the country. Maximum production is vital. This is one reason why so many operators are changing over to S-D 1-2-3 "Automatics". These amazing cars produce tremendous tonnages. They can be handled so much easier and quicker and with so much less labor. They are so close to the ground, and their capacity is so large. They can be dumped automatically—without labor—20 cars a minute or more. Then, bingo! back into the mine.

But production is not everything. S-D 1-2-3 "Automatics" save so much labor and so much repair cost. Thus, they save so much money. The records of many operators show savings averaging 26¢ a ton. Do you want the cold proof? We have it. Ask for it. Moreover, they reduce coal breakage. Does that appeal to you?

Are we busy? Running full capacity. But we will try to get you some S-D "Automatics" in not too long a time. We will do our best. You need these cars. You should have them. And we think you should now be preparing yourself for big capacity and low cost of coal by installing these "Automatics" now.

You know you do not have to put up the cash for them. We will rent them on a basis that over fifteen years will cost you less than 2¢ a ton for the coal hauled. Furthermore, at any time you have an option to buy the cars and stop rent—any time you prefer to do so. So you win either way.



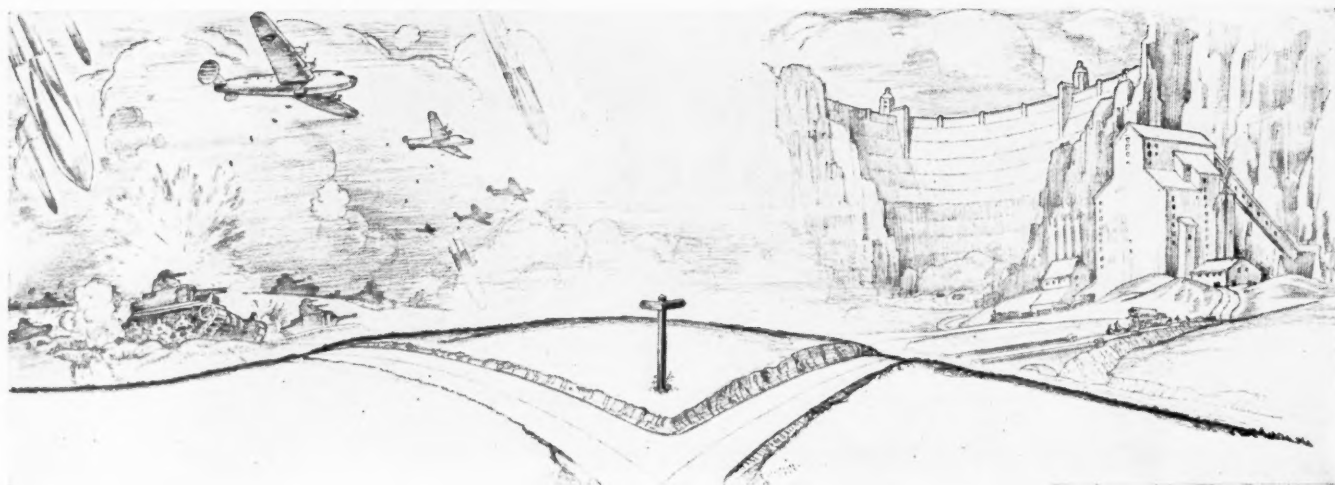
Of course, we make the well-known S-D Whopper Rotary and End Dump Cars as well. Loads of them. We also make transfer cars, eight-wheel cars, drop-bottom cars with five or six doors, cars sixteen to twenty feet long, cars that will haul almost any tonnage of coal. We have even made our automatic cars in railroad size, fifty ton cars or more.

We also make big trailers for strip mines, and monitor cars for inclines, and big sheave drums, and spool drums, and sheaves, and rollers, etc. We also make mine car wheels of the finest quality in the United States. Our reputation on wheel castings is country-wide. Our designs for anti-friction bearing wheels are in a class by themselves—either for tapered roller-bearing wheels or ball-bearing wheels. Our S-D "Floater" Ball-Bearing Wheel holds grease for about ten years, and makes the mine car run like a baby carriage.

Surely you can write us about something or other before this day is closed. We'd love to hear from you.



Sanford-Day Iron Works, Knoxville, Tenn.



We Shall Try to Keep the Record Straight

Do NOT picture the explosives manufacturer as one who simply presses a button and, presto! peacetime commercial explosives production is transformed into powder for shells and bombs.

To begin with, commercial explosives manufacturing facilities are not suitable for munitions production. Dynamite is not used in bombs and shells. TNT is not made in a dynamite plant. Complete new plants must be erected on a gigantic scale.

Peacetime explosives are essentials of constructive effort, so much so that Government recognizes their necessity in construction projects, in mining, in quarrying and other primary enterprises. Continued production of commercial explosives is important in maintaining the economy.

In the second place, the making of explosives is only one of the uses to which chemicals are put by an industry such as "Atlas Powder." Other Atlas chemical products—finishes, coated fabrics, activated carbons, synthetic chemicals, processing aids—are fundamental products indispensable to many phases of industry.

War demands come first—and Atlas has enlisted for the duration.

What Atlas has to offer is "knowledge" in the art and science of explosives making—experience, technique, laboratory foresight—the capacity to organize and train for large-scale production. Atlas is now operating for the Government, Government-owned plants such as those at Ravenna, Ohio, and Weldon Spring, Mo. In these plants, we are contributing our competency and service on a fixed fee basis.

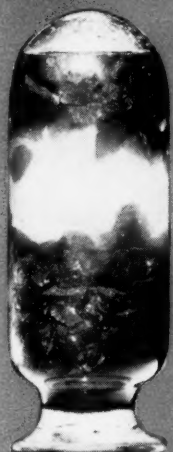
But with all our involvement in the war effort, we are doing our level best and meeting the demands of commercial production. As in any other industry, problems are tough and plentiful. Ingenuity, elbow grease and patience are great aids when producer and customer cooperate—it is amazing how much can be accomplished—and we shall try to keep the record straight.

ATLAS

EXPLOSIVES
"Everything for Blasting"



ATLAS POWDER COMPANY, Wilmington, Del. • Offices in principal cities • Cable Address—Atpowco



Any washer can clean this coal

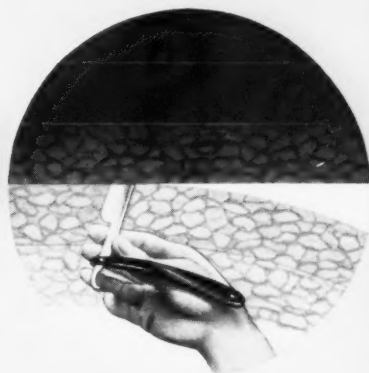
In this float-and-sink test, coal
and impurities separate readily.
Washing this coal is easy.



This coal needs clean-cut separation

Note the near-gravity mid-
dlings in this photo. Yet the
McNally-Norton will accu-
rately separate this coal from
the refuse . . . and do it well.

HOW TO GET CLEAN-CUT SEPARATION when washing your coal



How to convert raw coal into premium fuel—uniform in quality and low in ash—without undue loss of coal in the refuse is a pressing problem with operators. Many have solved it by turning to McNally Pittsburg, the country's outstanding authority on coal washing and preparation. The McNally-Norton washer, for example, gives clean-cut separation at any desired gravity, because of its automatic float mechanism, undercut refuse gate, automatic refuse control, and other patented features. Whether you are considering the addition of a washery to your tippie or an entirely new preparation plant, McNally Pittsburg engineers can help you. The 3-way service includes design, manufacture, and erection . . . full responsibility from blue print to plant in full operation. Just ask us to survey your preparation facilities and make recommendations . . . in the meantime let us send you Bulletin No. 441—it's free.

McNALLY-NORTON

Patented

Automatic Washer

A McNALLY PITTSBURG PRODUCT



McNALLY PITTSBURG

SPECIALISTS IN COAL PREPARATION

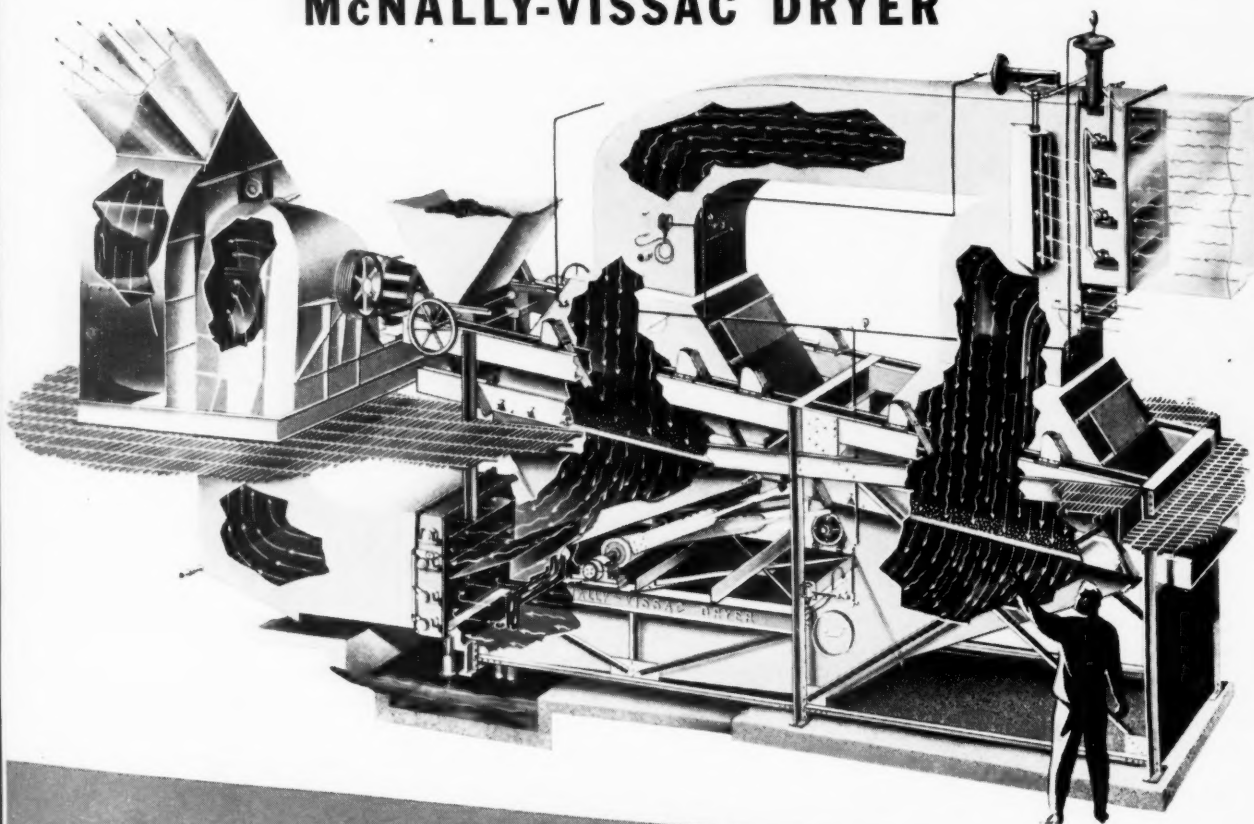
HOW TO DRY YOUR COAL AFTER WASHING

Now you can afford to dry your small sizes at a fraction of former costs with a McNally-Vissac coal dryer. Assisted by the patented pulsator as high as 50% of the surface moisture is removed mechanically. This feature continues to save fuel every day the dryer is in operation. In addition to the low cost of operation, the McNally-Vissac dryer offers these advantages. *Reduced fire hazard . . .* low gas temperatures minimize possibility of ignition. *Low power consumption . . .* approximately $\frac{1}{3}$ horse power is required for each per cent of moisture reduction. *Automatic dedusting . . .* sizes below $\frac{1}{2}$ mm are automatically rejected making output dust-free. *Wide range of sizes . . .* 2" to $\frac{1}{2}$ mm or any intermediate size without degradation. *Large capacities . . .* 50 to 100 tph per unit made possible by patented pulsator action. Further information on request, also write for Bulletin No. 940 entitled "Coal Drying." It will be sent without obligation.

50% Less Heat

Patented pulsator makes possible the mechanical removal of as high as 50% of the moisture, thereby resulting in saving in heat requirements of as much as 50%.

McNALLY-VISSAC DRYER



40% Lower Cost

Because its tph capacity is so great, the first cost of the McNally-Vissac dryer is lower. Operating costs equally low.

McNALLY PITTSBURG MFG. CORP.

Main Office and Works
Pittsburg, Kansas

General Sales Office
307 N. Michigan Ave., Chicago

Eastern Office
Koppers Bldg., Pittsburgh, Pa.



SUPER LUMPS

Hold No Terrors

FOR U.S. RUBBER BELTS

Here, in one of the largest mines in the country, a 30-inch U. S. MATCHLESS Mother Belt is being ruthlessly bombarded by two 18-inch U. S. MATCHLESS anti-drag room belts. Then, under low ceilings, over uneven floors, the coal moves steadily, speedily and efficiently on its 2000-foot trek to the cars.

And it's because U. S. Conveyor Belts are able to take such thorough-going beatings...

because, day after day, they absorb this terrific kind of punishment and return doggedly for more...*because they are so constructed that they cannot be affected by mildew* — that more and more U. S. Conveyor Belts are being specified by mine operators and builders of belt conveyor systems.

We are always glad to furnish details of such installations, and to work with you and your engineers on your conveyor problems.

SERVICE BEYOND PRICE AND SPECIFICATIONS

United States



Rubber Company

1230 Sixth Avenue, Rockefeller Center, New York, N. Y.



You can
**PILE ON THE
 TONNAGE**

*when there's
 a*

**WALTER
 TRACTOR TRUCK**

up front to haul it!

The big problem facing every strip mine today, is how to step up production to meet the tremendous demands of the Defense industries.

Here's one sound solution! Use WALTER TRACTOR TRUCKS to haul greater tonnage per trip from pit to tipple and make more trips per truck, per day. Haul 20 to 25 ton payloads in single trailers and up to 55 ton payloads in double trailers, through any weather or running conditions.

Walter 4-Point Positive Drive provides the tre-

mendous power and traction that makes this possible. This advanced four-wheel drive has patented Automatic Lock Differentials which proportion the torque to each wheel according to its traction at any instant, delivering maximum power at all times. Other contributing factors are its suspended double reduction drive, high ground clearance, 14-to-1 Range Tractor Type transmission, scientific weight distribution and rugged construction throughout. Write today for full details on WALTER TRACTOR TRUCKS.

WALTER MOTOR TRUCK CO.
 1001-19 IRVING AVENUE, RIDGEWOOD, QUEENS, L. I., N. Y.

The new, better way to connect trailing cables— **O-B MECHANO PLUGS!**

1 POSITIVE, DOUBLE LOCK

—cannot be pulled apart by cable strain or dragging equipment.

2 SIMPLE FIELD INSTALLATION

—plug bodies can be installed on cables in the field, eliminating vulcanizing or unsightly cable splices.

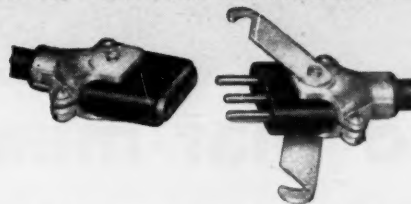
3 FOOL-PROOF HOOK-UP

—terminal sockets and plugs provide spring-tight electrical connection, prevent improper polarity.

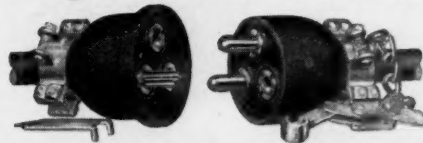
4 INSULATING RUBBER BODY

—protects man and device from electrical shock or mechanical impact. Joints are moisture and dust-proof.

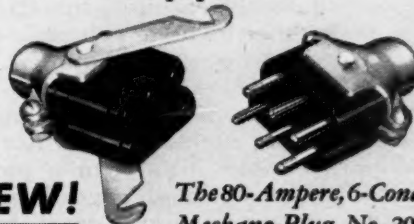
—AND HERE ARE THE THREE TYPES OF MECHANO-PLUGS



The 80-Ampere, 3-Conductor Mechano-Plug, No. 19654—a flat-type plug, designed to accommodate 3-conductor cable with No. 6 or smaller sizes of wire. Especially designed for making drill and small motor connections.



The 200-Ampere, 3-Conductor Mechano-Plug, No. 19478—a round-type plug, designed for 3-conductor cable with No. 2 or smaller sizes of wire. For making trailing cable connections to heavier equipment.



NEW!

The 80-Ampere, 6-Conductor Mechano-Plug, No. 20009—Especially designed for making connections to reversible motors on conveyors, etc. . . . For 6-conductor cable with No. 6 or smaller sizes of wire.

2291-M

OHIO

MANSFIELD

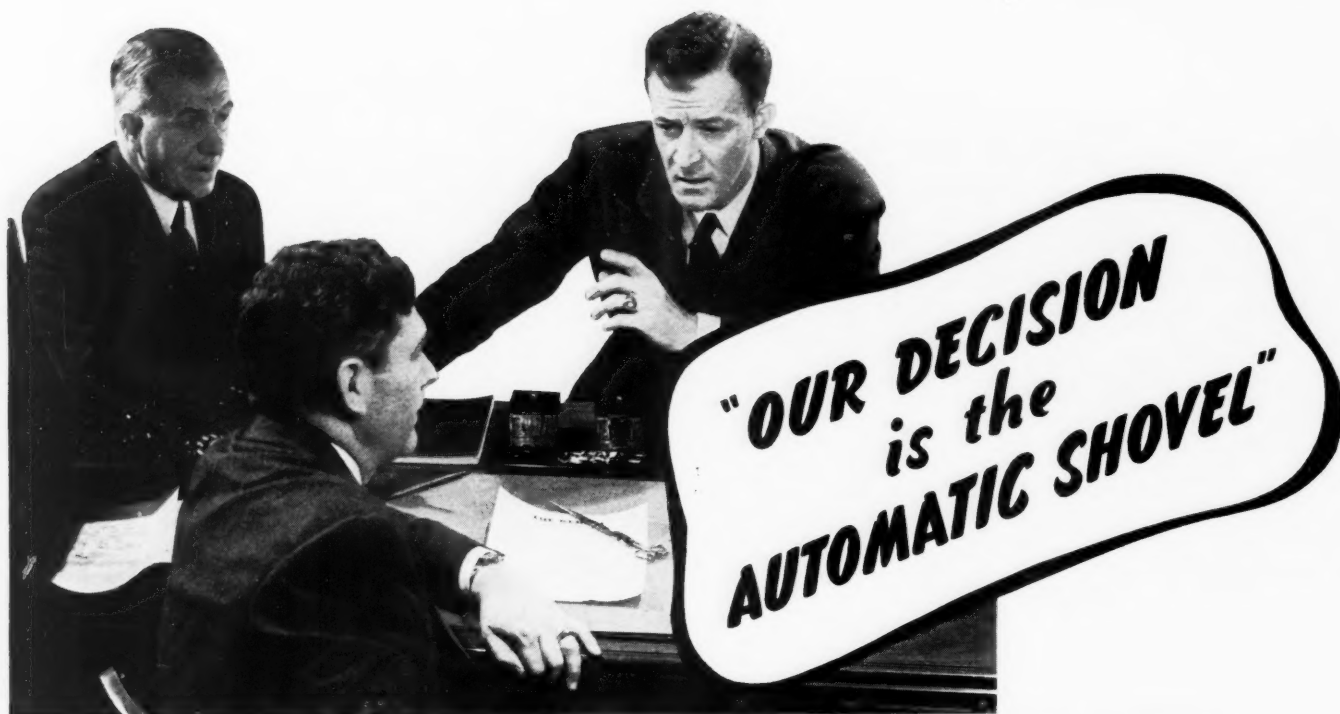


BRASS

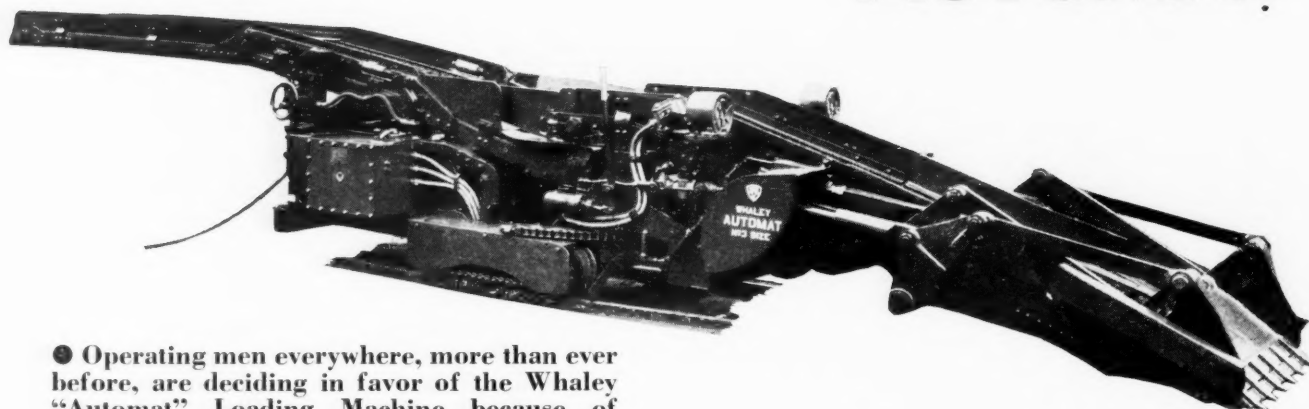
OHIO · U · S · A

Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

COMPLETE O-B PROTECTION FOR CONTINUOUS PRODUCTION



—and that means, The WHALEY "AUTOMAT"



● Operating men everywhere, more than ever before, are deciding in favor of the Whaley "Automat" Loading Machine because of several very definite reasons. Investigations prove to them that the basic principle of our shoveling mechanism is the simplest, most effective and most practical known. They have learned that during 33 years of building mechanical loaders exclusively, we have constantly improved our loaders to a point of mechanical perfection and ruggedness that interruption in production caused by mechanical failures, are seldom heard of. This means top production, minimum repairs and lowest maintenance cost.

These men recognize that the most vital element of a loading machine is the loading head. And in the "Automat" they recognize the fact that the exclusive shoveling mechanism permits the most economical use of power. Consequently, one motor of only 25 HP is more than ample to operate the "Automat" at full loading capacity. With power consumption of the "Automat" only $\frac{1}{3}$ KWH per ton of material loaded, lower power costs are inevitable, compared with other machines.

From a Safety standpoint, these men favor the "Automat" because they know that safety is built into the "Automat". Its shovel action is a simple,

natural, vertical lift and pulling operation. After moving forward under material, it lifts and simultaneously pulls backward for depositing material on Jib conveyor and then returns to shoveling position for more material. No dangerous side-kicking of machine . . . no dragging of shoveling mechanism . . . no knocking out timbers in close places.

Take advantage of these features for maximum production at lowest cost in your mine now. Write Myers-Whaley Company, 122 Proctor Addn., Knoxville, Tennessee.



MECHANICAL LOADERS EXCLUSIVELY FOR OVER 33 YEARS

O-B AUTOMATIC COUPLING is 3 ways better



RUBBER DRAFT GEAR.....

unbreakable . . . conserves space . . . yet
absorbs compression blows of 50,000 lbs.



POSITIVE INTERLOCK . . male-and-
female design maintains engagement under
vertical and lateral strain or pressure.

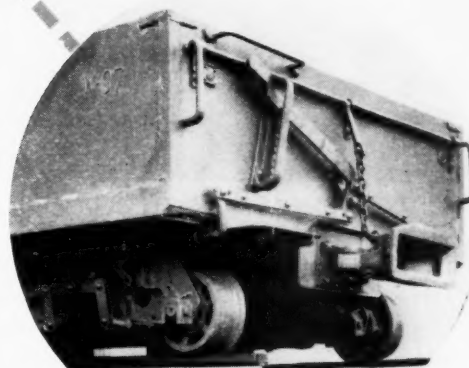


AUTOMATIC SELF-CENTERING . .

makes it unnecessary to manually center
coupler heads after uncoupling on curves.

Some *so-called* automatic couplers have one of these features. Some have another. Some have none! But only the O-B Automatic Coupler gives you *all three*—only the O-B Coupler is truly automatic!

Why jump halfway when it comes to automatic coupling? Get your money's worth. Get the best—specify O-B Couplers for your new cars. Send us a drawing of your proposed car and we'll be glad to show you, at no cost to you, how O-B Couplers can be incorporated in your car design. Write today or consult your O-B representative.



*For greater safety, higher haulage speeds, car
handling convenience and lower maintenance
—specify an O-B Automatic Coupling System!*

2292-AM



Canadian Ohio Brass Company, Ltd. Niagara Falls, Ont., Canada

COMPLETE O-B PROTECTION FOR CONTINUOUS PRODUCTION

A new type of m



How to forge better bits on hollow drill rods

By following a few simple steps in the forging of bits, many mine shops are getting considerably more service out of every foot of their hollow drill steel. This way they help to release tons of steel for other urgent uses and they save money to boot.

The first step toward more service is the cutting. The bar is held securely in a vise and cut off perfectly square with a hack saw. A good bit cannot be forged from an irregular or uneven end. Unless the end is cut square, premature failure of the drill may result.

The next step is heating. This should be carried out in a slightly

smoky atmosphere, using reflected or indirect heat to minimize scaling. The end of the bar should be heated uniformly to between 1800 and 1950 deg. F. The forging is started at this temperature—when the bar has cooled to 1650 deg. F., the forging is discontinued. In forging the bit, the hole should be kept opened to its full diameter with a pin. This is necessary because the upsetting in forming the wings will tend to close the hole.

Bethlehem Superior Hollow Drill steel is used both as bitted drills and as rods for detachable bits. It is well suited to all mine drilling operations.



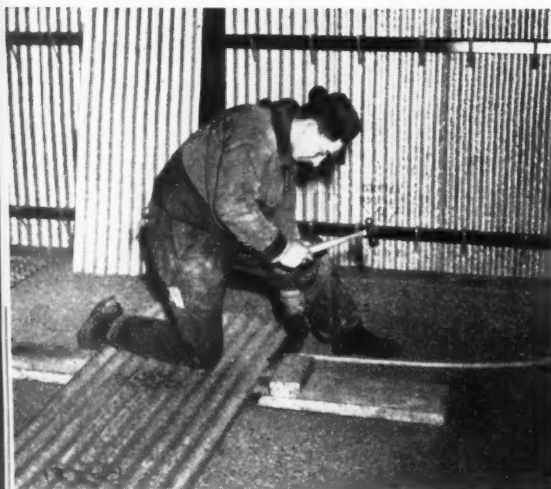
Get more life from your present wire ropes

Now, with war demands underlining the need for conservation of vital materials, mine operators are more than ever concerned with prolonging the life of wire rope.

One proven method of getting longer service from ropes is the replacing and reconditioning of worn sheaves. A sheave groove worn too deep will squeeze a rope like a vise; a groove that is too wide will not support the rope and will allow it to flatten out, while a groove worn rough may tear the wires.

To prevent any of these conditions from stealing rope life each groove should be gaged at regular intervals. If the proper gage does not bottom, the sheave should be replaced or repaired without delay.

When any type of wire rope is needed for replacement or for new installations, Bethlehem can furnish the proper construction and size. Bethlehem ropes are made in diameters up to and beyond 3 inches, both Form-set (pre-formed) and regular.



Beth-Cu-Loy Roofing Sheets conserve steel

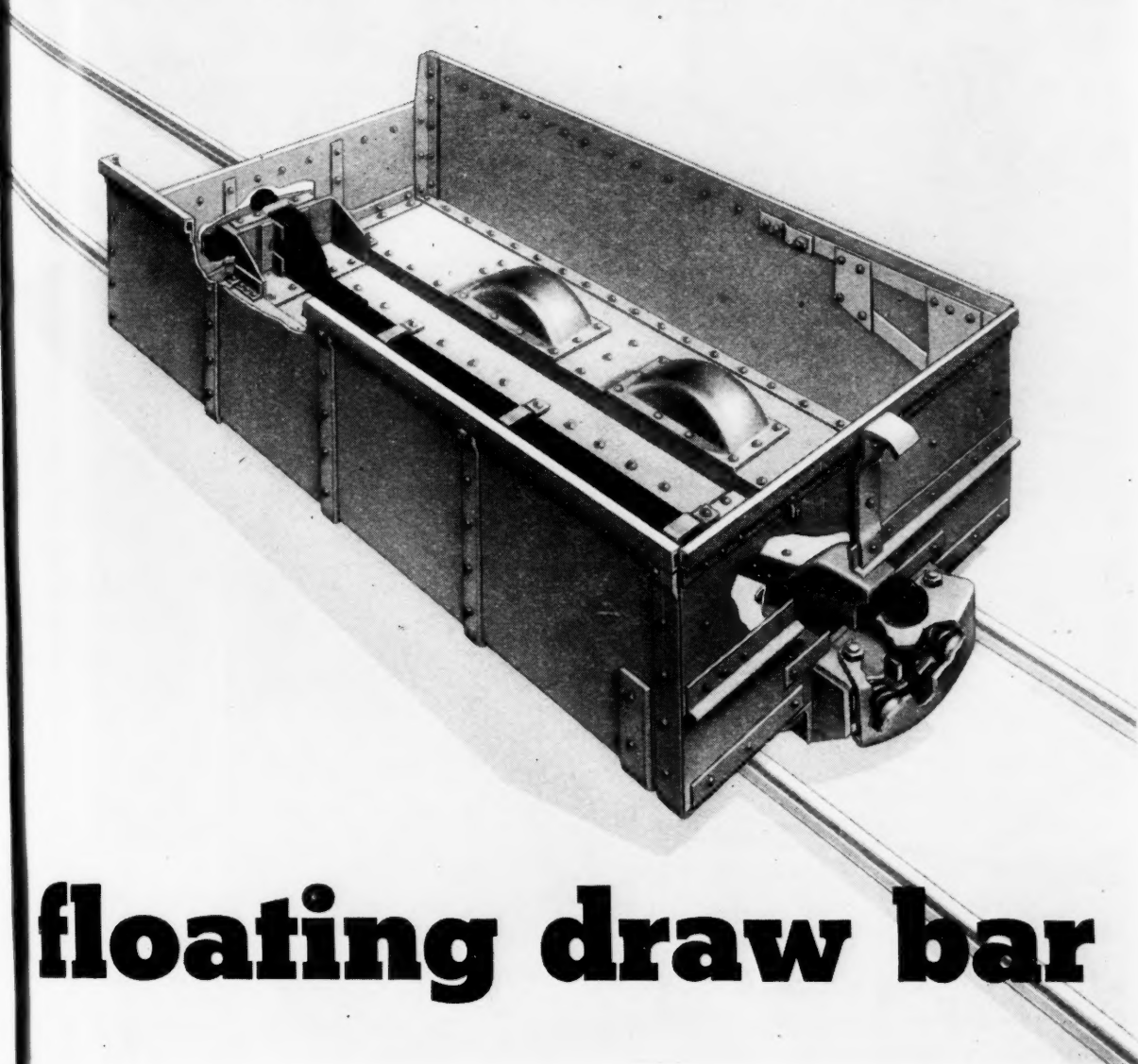
By using rust-resisting steel siding and roofing instead of ordinary steel sheets, mine operators can do much to conserve steel for America's all-out war effort.

For example, Beth-Cu-Loy copper-bearing steel sheets outlast ordinary steel sheets 2 to 2½ times, consequently replacements are decidedly reduced. Beth-Cu-Loy sheets contain

0.20 to 0.30 per cent copper, the right amount for maximum rust resistance. This has been proved in tests conducted by the A.S.T.M.

Bethlehem makes five types of galvanized Beth-Cu-Loy roofing sheets—corrugated, 2-V crimp, 3-V crimp, 5-V crimp and Stormproof. Two types of Beth-Cu-Loy siding are available—corrugated and 2-V crimp.

mine car with a



Phantom view of Bethlehem's new mine car. At each end of the car are shown the spring buff and draft connected by the floating draw bar. Notice the heavy construction of the draw bar.

floating draw bar

Here's something new in haulage equipment—a new type of mine car designed to meet the present emergency demand for a car that will stand up better in either single- or double-turn service.

Here's what this car has. A spring buff and draft located at each end, connected by a floating draw bar that runs the length of the car. Dual spring drafts located outside instead of inside the car. Body of Mayari R, Bethlehem's high-strength low-alloy steel. Stub-axle construction with anti-friction wheel bearings.

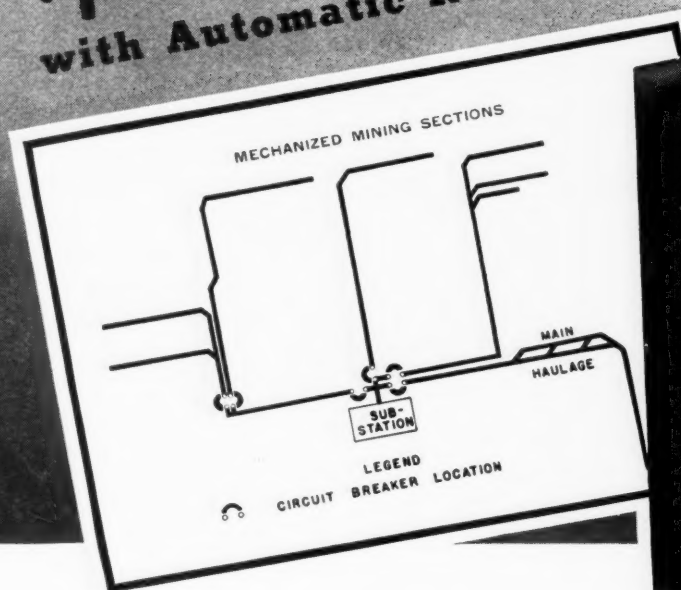
Here's how it works. When the car is traveling in either direction the pull at the

front is always transmitted through the floating draw bar to the springs at the back end of the car. In this way, the rear springs are the ones compressed; there is no pull on the front end of the car at any time. This action tends to push the car from the rear instead of pull it from the front. It tends to hold the car together and prevents the ends from being pulled off. Furthermore, the outside location of the springs eliminates spring failure resulting from corrosive action of the coal. When used in a train there is no strain on the individual car; the pull is transmitted directly from one draw bar to the next.



In any review or forecast concerning the mining industry, remember . . .

Down go maintenance Tie-Ups after SECTIONALIZING with Automatic Reclosing Circuit Breakers



Overloading of mining and loading machines is the biggest contributor to underground production tie-ups. It keeps an unwarranted amount of equipment out-of-service in repair shops.

Under ordinary conditions of operation, repairs mean expense, chiefly in money. Now, when every pound of mined coal is needed, repairs mean losses in tonnage—far more important than the cost of machine parts.

One of the many advantages of SECTIONALIZING is that electrical current is apportioned to a section in accordance with need. Machine-runners are automatically assisted in operating the equipment in keeping with the recommendations of the machine-builders. The result is that breakdowns are infrequent and production-losses held to a minimum.

1. Increase production with better operating continuity
2. Reduce maintenance by preventing machine-abuse
3. Decrease power consumption
4. Improve voltage by tying feeders together
5. Lower fire-and-explosion hazards



Representatives in Principal Mining Areas

I-T-E CIRCUIT BREAKER CO., PHILADELPHIA, PA.



FUEL FOR THE FIRES OF VICTORY

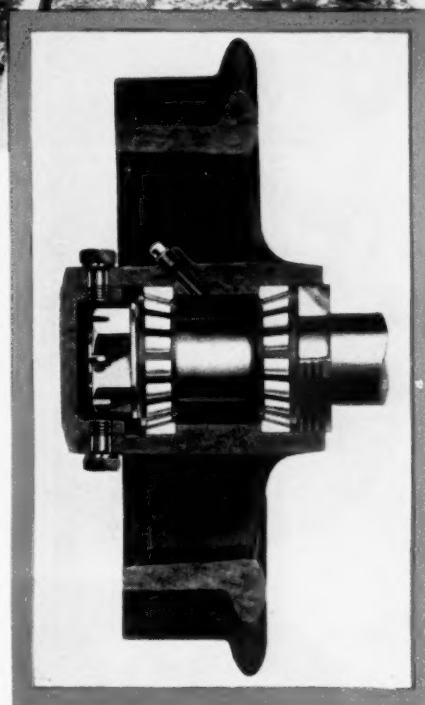
Timken Bearings are helping mining equipment do a great job for the Victory Program. They will be just as valuable in the competitive era following Victory.

The photograph shows a train of Enterprise mine cars equipped with Timken Bearings at Imperial Smokeless Coal Company, Quinwood, W. Va. There are 250 of these large capacity cars in service. The old cars were abandoned and the mine modernized under new ownership.

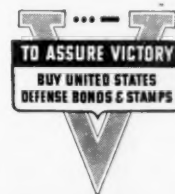
Nearly 400,000 mine cars now are rolling on Timken Bearings, to say nothing of loaders, conveyors, hoists and specialized equipment of various kinds.

Post-war conditions may be tough—but not too tough for new and redesigned equipment containing a full complement of Timken Bearings.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO



Timken Roller Bearing mounting as used in mine cars.



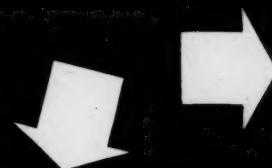
TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

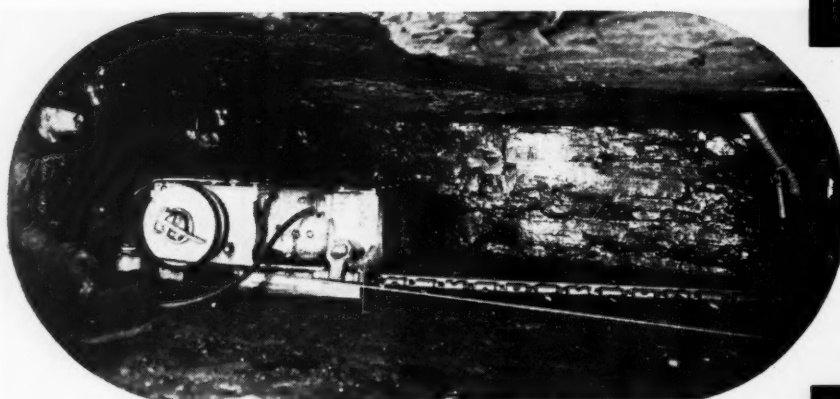
Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

ONLY SULLIVAN OFFERS



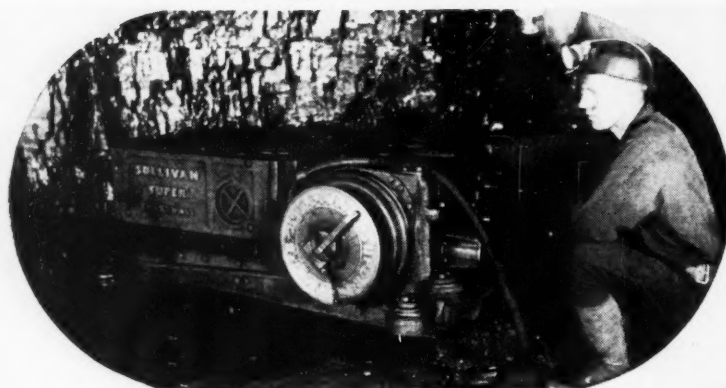
**LEVER-CONTROLLED ROPE DRUMS FOR
FASTER, EASIER SHORTWALL OPERATION**

SUMPING



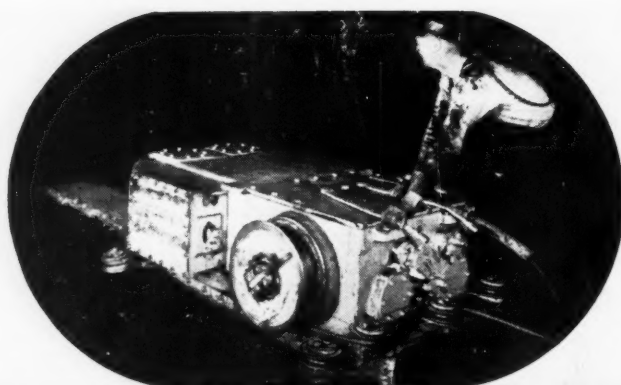
Take-up is smooth and gradual with Sullivan lever-controlled rope drums. Only a moderate pull on lever is required to firmly engage the clutch. Drop the lever and it moves back to neutral.

CUTTING



Locking pin arrangement to hold lever in position can be used, if desired, while cutting. One pull on the lever allows the pin to drop out of the way.

MOVING



Machine runners appreciate the quick, easy responsiveness of lever-controlled rope drums and minutes are saved in eve shortwall operation.

SULLIVAN ALSO MANUFACTURES THE 7-AU UNIVERSAL TRACK CUTTER AND THE 9-B OVERCUTTER



SULLIVAN

"WE SPECIALIZE IN COAL CUTTERS"

Coal Mining Machines • Scraper Haulers
Rock Loaders • Hoists • Car Pullers
Air Compressors • Rock Drills
Cutter Bit Sharpeners and Heaters
Core Drills and Core Drill Contracting.

All THESE FEATURES . . . IN A . . . SHORTWALL LINE

✓ Lever-controlled rope drums for faster, easier handling.

✓ Cuttings discharged at rear for convenient handling of bug dust.

✓ Complete splash lubrication for longer life.

✓ Anti-friction bearings at all load-bearing points for efficient power transmission.

✓ Alloy steel gears and shafts for low maintenance.

✓ "Lift-in, Drop-out" type cutter chain clutch which cannot become accidentally engaged.

5B-1

5B-1—10 H.P.—Light duty Shortwall and lowest machine on the market that delivers cuttings to rear.

11-B

11-B—20, 35 or 50 H.P.—The lowest cutter in its power range which discharges cuttings to rear.

7-B

7-B—50 H.P.—Particularly adaptable to modern mechanized mining, due to the fact that its cutting capacity is greater than that of modern loading units.

WRITE TODAY FOR COMPLETE INFORMATION ON SULLIVAN'S LINE OF MODERN COAL CUTTERS

SULLIVAN MACHINERY COMPANY

EXECUTIVE OFFICES—MICHIGAN CITY, INDIANA

Factories: MICHIGAN CITY, IND.; CLAREMONT, N. H.; GRANTHAM, ENGLAND

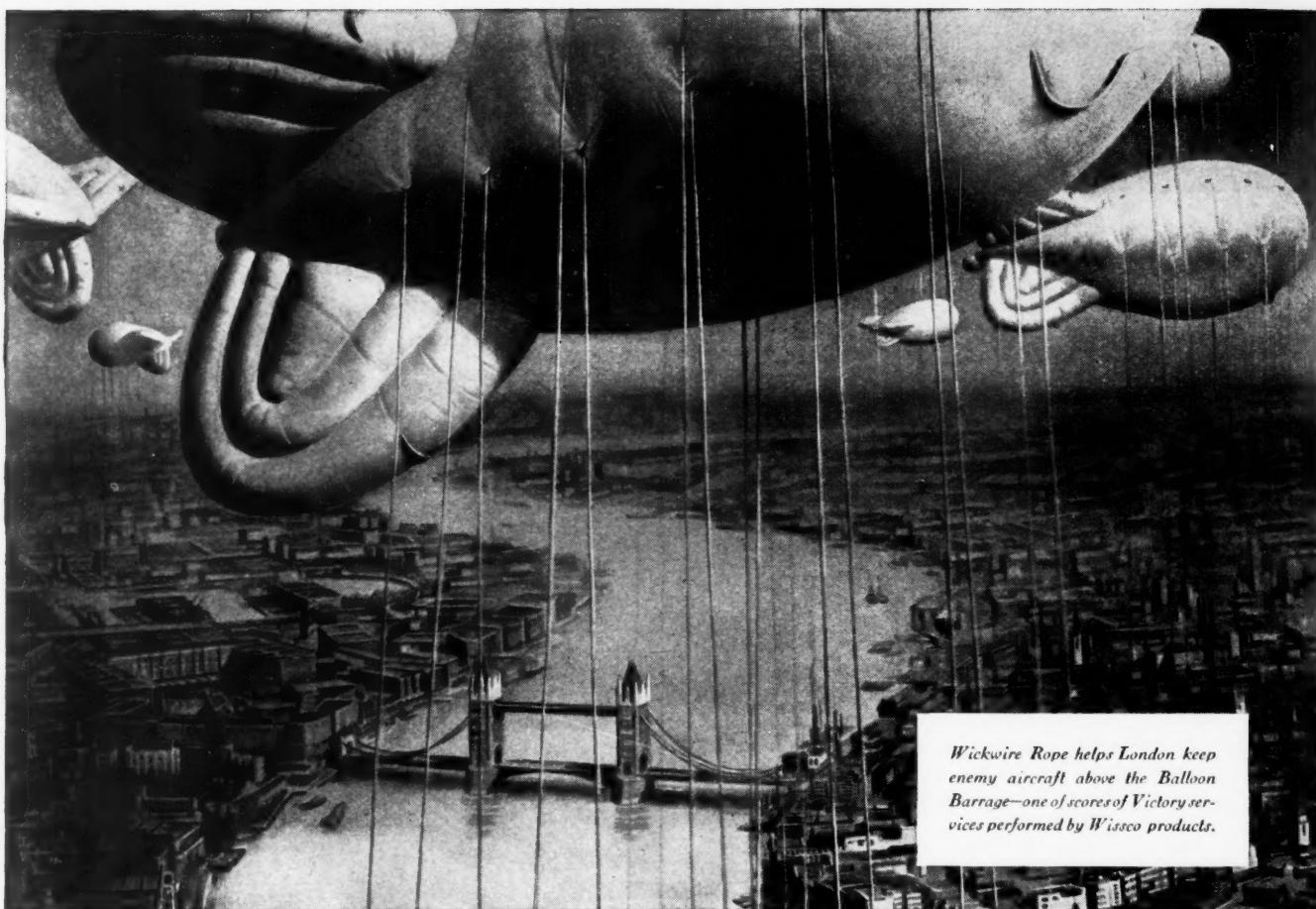
Associated House: CANADIAN SULLIVAN MACHINERY CO., Ltd., Dundas, Ont.

Birmingham, Ala.
Butte, Mont.
Chicago, Ill.
Dallas, Texas

Denver, Colo.
El Paso, Texas
Huntington, W. Va.
Knoxville, Tenn.

Middlesboro, Ky.
New York, N. Y.
Pittsburgh, Pa.
San Francisco, Calif.

Salt Lake City, Utah
Scranton, Pa.
St. Louis, Mo.
Johannesburg



Wickwire Rope helps London keep enemy aircraft above the Balloon Barrage—one of scores of Victory services performed by Wissco products.

A Message About Wire Rope

FROM LONDON'S BALLOON BARRAGE!

Here is a vital message written in steel upon the skies over London . . . where a single order for 587 miles of Wickwire Rope now adds its bit in protecting a great city from dive bombers.

Every foot of that wire rope is an eloquent argument in itself, speaking directly to every user of wire rope—whether used for war, or for essential civilian services.

The message is: **VICTORY NEEDS STEEL!** Victory needs night and day all-out efficiency in every industrial operation. Wire rope that fails too soon wastes steel. The time wasted replacing it is a red stop light on Victory.

You can speed Victory by using wire rope of the correct size and type for your service . . . then by taking proper care of it, so that it lasts.

The long life of Wickwire Rope begins with skillful production of the metal in our own blast furnaces. It continues through proud care and precision methods in drawing the wire, and laying the rope. Wickwire representatives give expert help in advising on the best type of rope for each use. And after delivery, Wickwire Service in the field continues to work with you, to assure longest life on the job.

Our authoritative "KNOW YOUR ROPES" manual, on the selection, application and usage of wire rope, has profited more than 25,000 rope users. Ask for your copy today. Write Wickwire Spencer Steel Company, 500 Fifth Avenue, New York, N. Y.



A FOOT OFF may make your rope last longer. Constant bending and unbending around a sheave will finally wear out any rope. A foot off the rope redistributes the wear. This and forty more rope life-savers are pictured and described in our booklet, "Know Your Ropes."

SEND YOUR WIRE ROPE QUESTIONS TO WICKWIRE SPENCER



WICKWIRE ROPE

Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City



Read What
MINING MEN
Say:

A PRODUCTION EXECUTIVE Says:

"Among the advantages CARDOX brought to this mine was a 30% increase in face tonnage due to the fact that we were able to lengthen our mining undercut from 6½ feet to 9 feet."

AN OPERATING SUPERINTENDENT Says:

"The tonnage per man in our mine, which is 100% conveyor loading, has been considerably increased since we installed CARDOX. This is because of the fact that CARDOX rolls the coal forward from the working face for easy loading."

**PROFITABLE
PRODUCTION
STEPPED UP**

CARDOX
The Non-Explosive Mining Method

TIME LOSSES CUT

"As we operate on double and triple shifts, the absence of smoke and fumes means considerable to us. CARDOX permits us to complete our cycle of operation in a manner that would be impossible with explosives."

Send For The Booklet

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TIME

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SIMPLER AND MORE ECONOMICAL MACHINE DESIGN, due to elimination of many costly mounting parts and machining operations, otherwise required; **EASIER AND FASTER MACHINE ASSEMBLY AND DISASSEMBLY**, since the “CARTRIDGE” BEARING is an integrally sealed unit needing no complementary mounting parts; **100% GREATER GREASE CAPACITY**, due to double-row width creating a greatly enlarged grease reservoir; **COMPLETE AND LASTING EXCLUSION OF DIRT AND FOREIGN MATTER** by the use of tightly fitting, wearless, all-metal seals; **SEALED FOR ANY POSITION**, since the seals retain the lubricant regardless of shaft angle; **EASY REGREASING AND INSPECTION WITHOUT DISMOUNTING**, by means of refilling plug and removable seals.

Write for the Catalog. Submit your bearing problems for study and recommendation, without obligation. NORMA-HOFFMANN sales and service engineers, and distributors in principal cities stocking “CARTRIDGE” BEARINGS, are at your service.

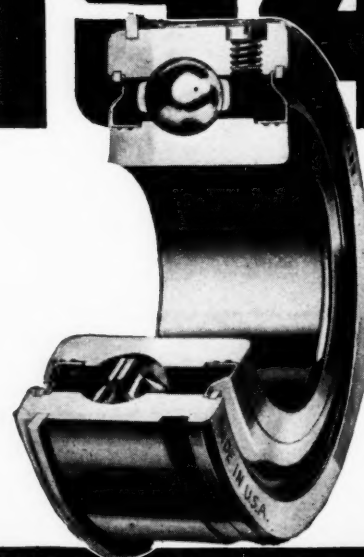
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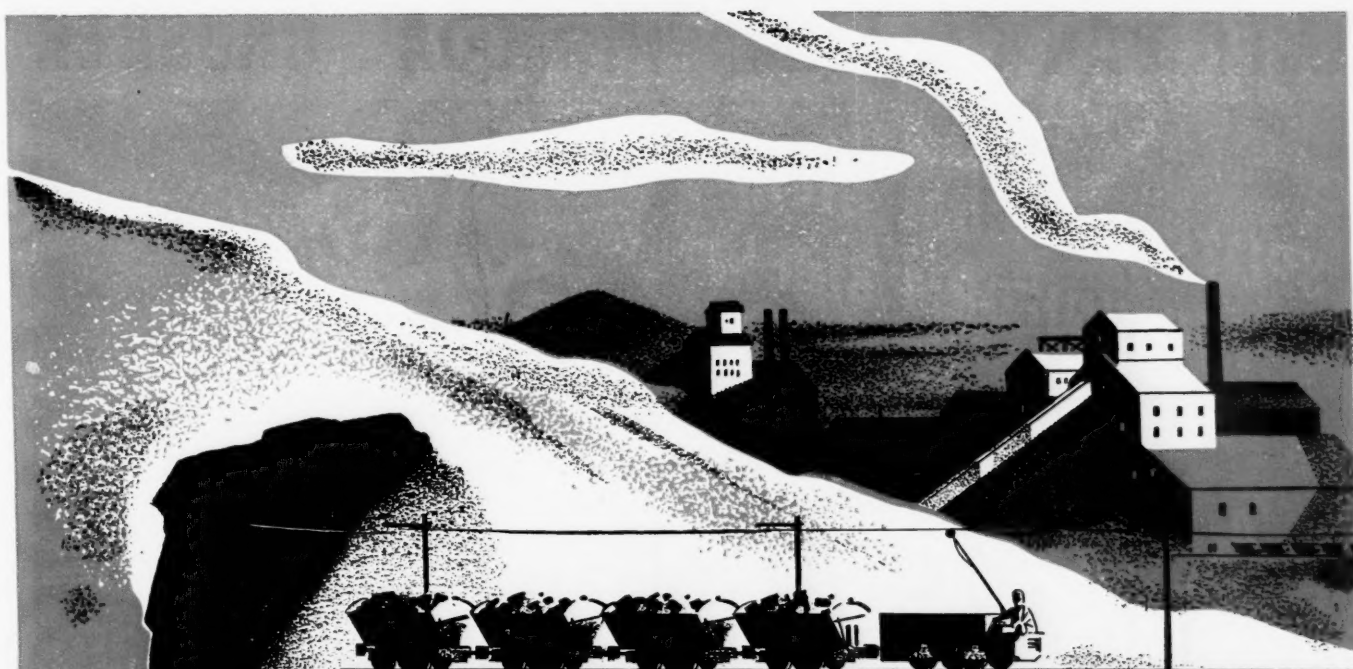
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PRECISION BALL, ROLLER and THRUST BEARINGS

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"Keep 'em moving"

**Electrical power and the research-built
Anaconda mining cables that carry it play a
vital role in our nation's mine production**

DEEP in the earth, men today bore steadily downward for the mineral riches that are making America's war-front the most impregnable in the world.

Important to their production is economical electrical power . . . not only because of copper's ability to carry electrical energy more efficiently than any other commercial material, but also because Anaconda has developed insulations that have the highest measure of resistance to abrasion and corrosion from mine waters, acids and alkalis.

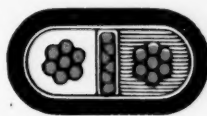
The research that built these wires and cables

continues apace, daily developing product improvements and many new products which, although not now available for civilian purposes, are helping our national war effort.



This familiar trade-mark symbolizes the best efforts of modern research and production.

42250



Insure Safety—Anaconda's exclusive, 2-conductor parallel Sunex Securityflex with ground wire affords a simple, effective method for grounding loaders, conveyors, cutters. (Today, all Sunex Securityflex* is urgently needed for defense . . . a situation that will not change until victory is assured.)

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February, 1942 — COAL AGE

37

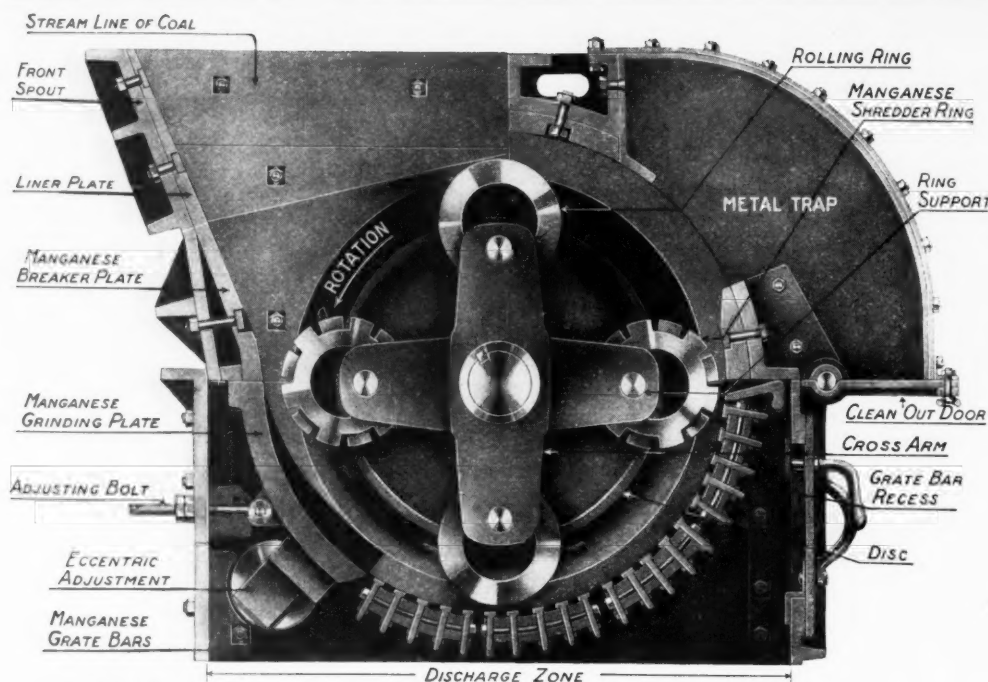
AMERICAN ROLLING RING COAL CRUSHER

**SPLITS THE COAL GIVING
YOU UNIFORM SIZE!**

**Does the Work at
Extremely Low
Cost per Ton!**

**MAINTENANCE COSTS
ARE NIL!**

**GIVES YOU PROPERLY
SIZED COAL FOR EITHER
STOKER OR PULVERIZED
COAL BURNING!**



The patented manganese shredder rings split the coal and prevent clogging.

They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course, because they are free to swing back out of position. There are no shear pins or other safety devices that require attention.



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★ Because of the Flexible action there is a reduction of power requirements to a remarkably low figure. It actually costs less than one cent a ton, including all costs, to reduce bituminous coal from lump to stoker size. Consult us now on your coal crushing problems. We will be glad to thoroughly survey your requirements and recommend only such equipment needed for your specific purposes. Each crusher guaranteed for the job. We have interesting statements from users — let us send you some of them — also ask for bulletin.

METAL TRAP or Tramp Iron Catcher

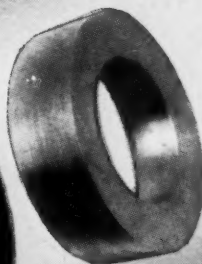
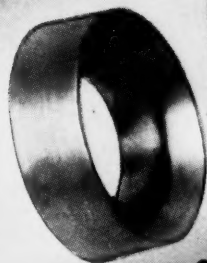
In order to trap foreign materials, the "S" type of American Ring Crusher can be equipped with a metal trap or tramp iron catcher. This device catches tramp iron, wire, and other noncrushable materials.

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ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

Typical
COMMUTATOR
of the
NEW G-E
D-C MOTOR

WE ASSEMBLE IT WITH 12 TONS PRESSURE



Assembly parts of the new G-E direct-current motor commutator: quill, steel caps, mica cones, hardened-copper and mica segments, and retaining lock nut

**BUT YOU CAN TAKE IT APART
—AND PUT IT TOGETHER—
WITH A HAND WRENCH**



YOU get good commutation in a G-E direct-current motor because the great pressure and high temperature applied in assembling the commutator—plus careful machining—assure rigidity, uniformity, and precise alignment of every part. Yet, in an emergency, the entire commutator can be conveniently disassembled after removing a steel lock nut and set screw. Reassembling on the job requires no press.

You'll find other new features in this commutator: mica segments on the open end extend beyond the copper segments to give increased creepage paths; a tumbling process completely eliminates burrs from the hard-drawn copper segments; and the end of the assembly has a smooth, arc-resistant surface of Glyptal No. 1201 Red.

But features of the General Electric d-c motor are by no means limited to the commutator. Get the facts on the tough armature; sturdy, adjustable brush rigging; Formex wire field coils; and improved bearings. Call or write your local G-E office for details that show why you can expect economical, dependable service from this motor. General Electric, Schenectady, N. Y.



General Electric d-c motor, Type B,
typical of the smaller ratings

GENERAL  ELECTRIC

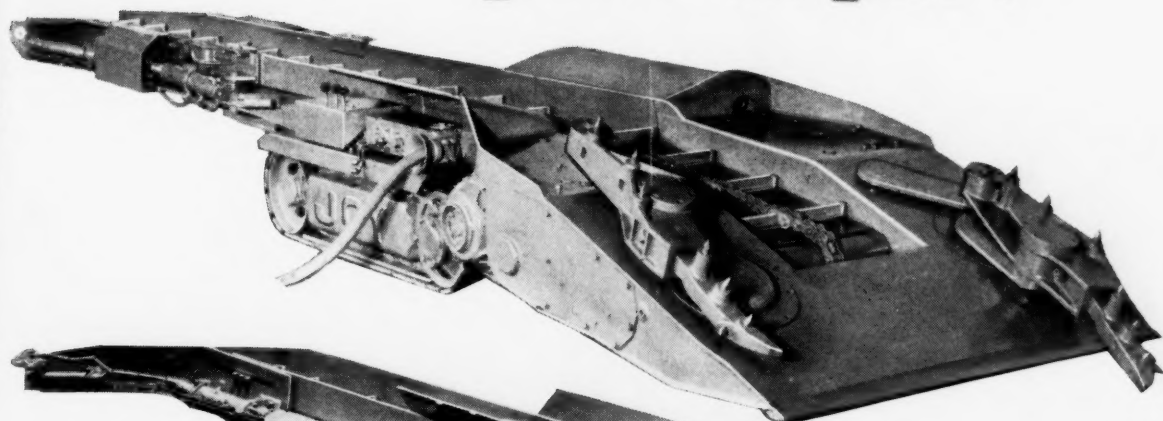
*It's Results
that count to-day*



**Just as the modern soldier is vastly
helped by mechanization...so is the
man in the mine aided by
JOY MECHANIZED EQUIPMENT**

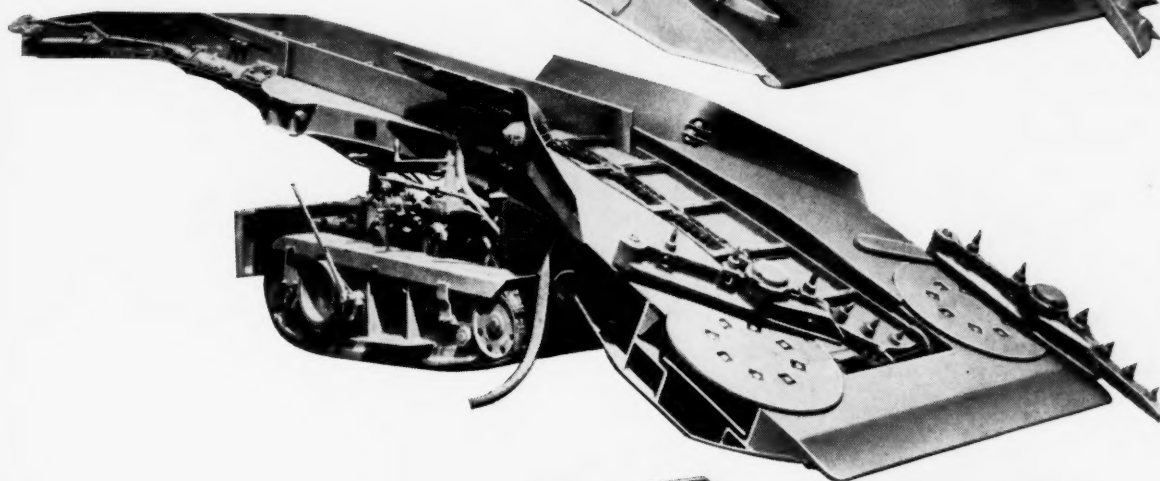
JOY MECHANIZATION

speeds output !



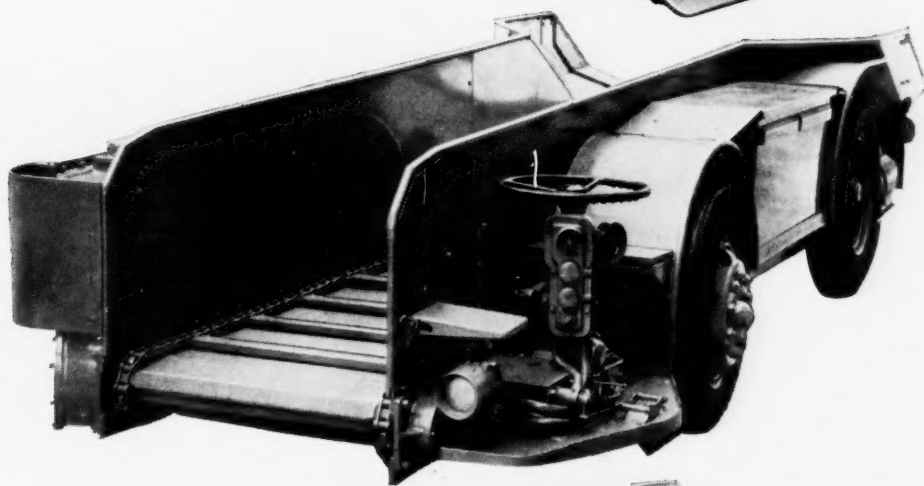
LOW VEIN MACHINE

JOY 14-BU LOADER
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26" high...5 tons per
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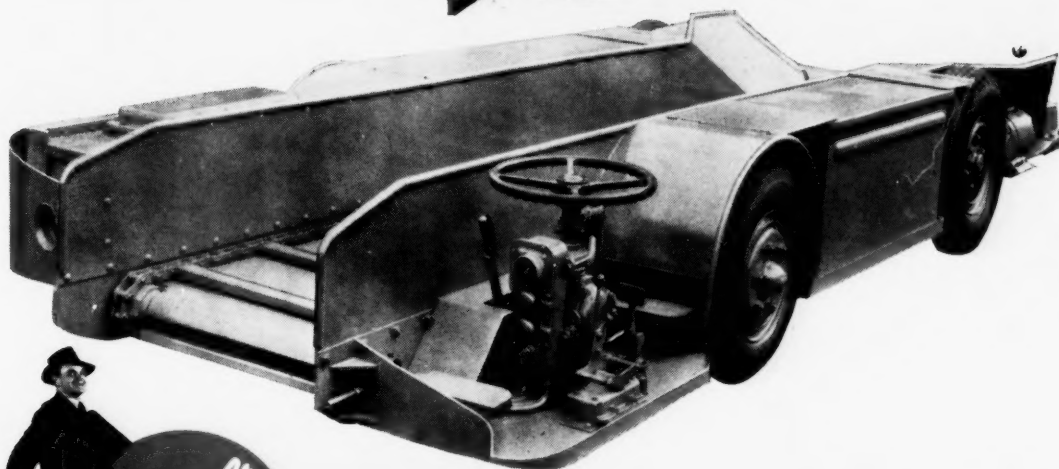
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6-TON CAPACITY SHUTTLE CAR

JOY 42" SHUTTLE
CAR—6 ton capacity
for high seams.



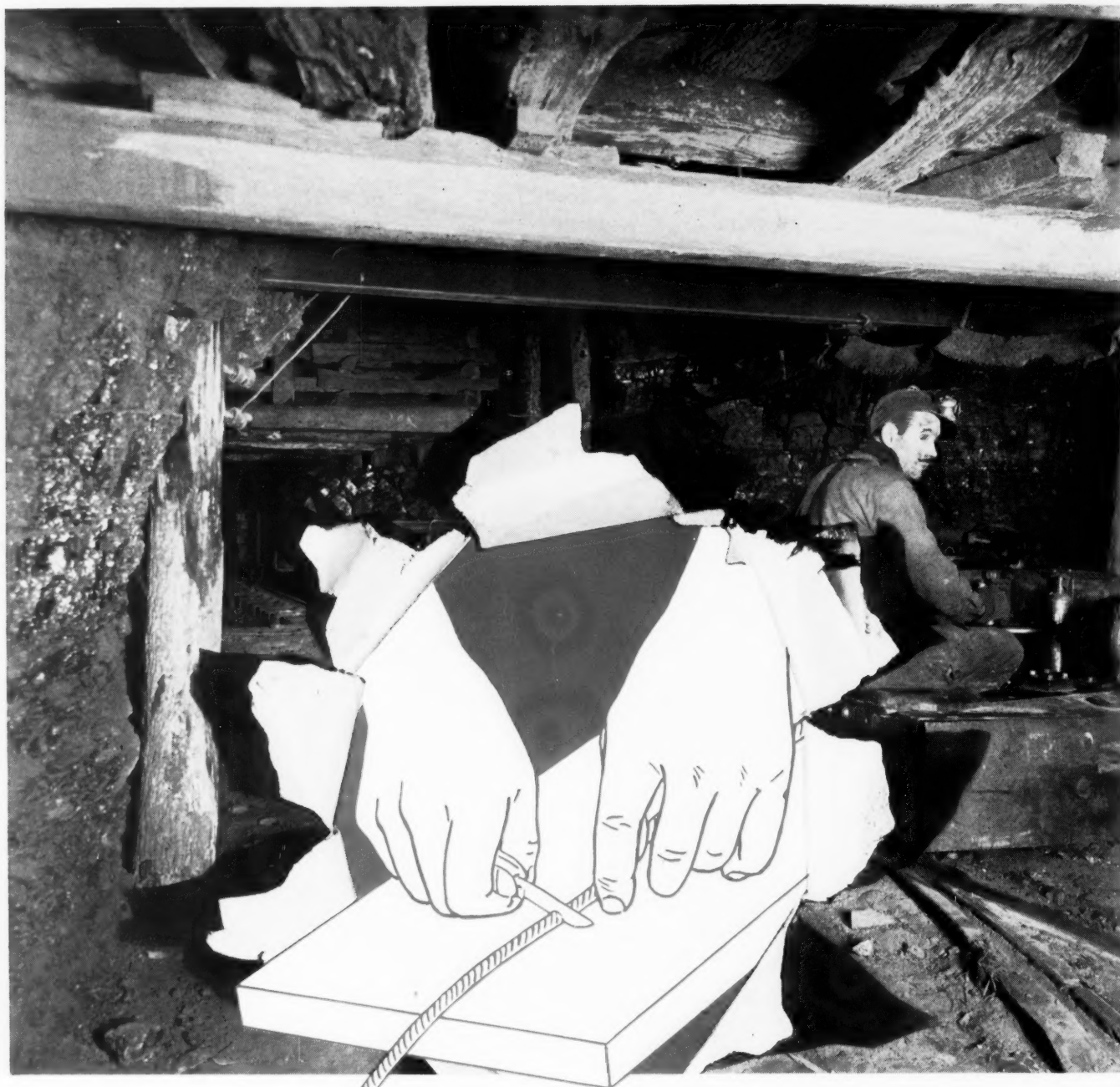
LOW SEAM SHUTTLE CAR

JOY 32" SHUTTLE
CAR—3½ tons capacity
for low seam operation.



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MANUFACTURING CO., FRANKLIN, PA.



Cut Square and Clean for Safety

Use a little more fuse than seems absolutely necessary—it's a safe precaution. Cut the fuse *squarely* across with a clean sharp blade; a dull knife might drag the compound across the powder train and cause interference with the end spit or the lighting.

Be sure that the end of the fuse extends well out of the mouth of the bore hole when the primer cartridge is in place.

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ENSIGN-BICKFORD SAFETY FUSE

Coal Age

Established 1911—McGraw-Hill Publishing Co., Inc.
SYDNEY A. HALE, Editor • FEBRUARY, 1942

Peace and War

WITH 1941 the last year of peace for the United States until victory is achieved, the coal industry can look back to improvements and modernization which give it a good start on the job ahead. Signing of new wage agreements, rising demand, and price stabilization cleared the way for accelerated adoption of the modern equipment and practices for production, preparation, and safety so necessary for progress in peace and even more vital in winning the war as soon as possible.

GAINS of 10.9 percent in bituminous output and 5.6 percent in anthracite sum up the production story. Improvement and modernization highlights include sales of 368 mobile loaders and 2,130 conveyors to coal mines, up 57.9 and 20.9 percent, respectively; installation of 204 rubber-tired haulage units, against approximately 155 in 1940; a substantial rise in purchases of new shovels and other stripping equipment; and a 10-percent increase in contracts for new preparation facilities and equipment.

EQUIPMENT was not the only measure of 1941 progress, however. An all-time record was made in coal-mine safety, reflecting a drop in deaths per million tons mined to an estimated average of 2.55, compared with 2.71 in 1940. Fewer explosions

were a major item in the new record. Research organizations were busy on projects for the immediate and future benefit of coal, as well as increasingly on ways in which coal can promote the war effort. The record of achievements not only in safety and research but also in production, preparation and relations with consumers and governmental authorities is an important part of this issue.

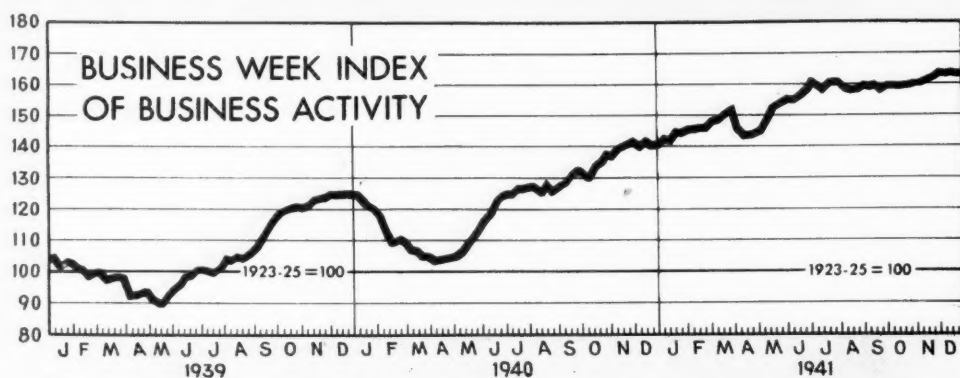
DEVELOPMENTS in 1941, however, are now history, and are shoved even farther out of the limelight by the pressing need for adjusting mining operations to the demands of the country's war program. More coal to meet increased arms requirements and at the same time supply civilian heat and power needs is now the goal for the duration. And with rising demands, the industry faces a new crop of problems in converting to a war basis, as well as an intensification of certain old ones.

MOST pressing are manpower, materials, maintenance and transportation to market. Others brought out or confirmed in a telegraphic query to a selected list of coal-mine presidents include training of new men, relaxation of working restrictions, encouragement of storage, revisions in distribution practices, and other related items. Illuminat-

ing, thought-provoking and suggesting the need for much more planning and cooperation within the industry and with the government, the individual statements are presented for consideration on pp. 50-55 of this issue.

WAR planning, however, must also take in all other phases of production and preparation. To get out the tonnage and get it out safely, not only must the necessary equipment be provided but mining, face-preparation, transportation, ventilating, pumping and drainage, preparation, safety and other methods must be the best possible to devise. In no other way can the necessary output and efficiency be assured.

CONCENTRATION on equipment and methods should not be allowed, however, to obscure the fact that power supply and maintenance are perhaps even more vital, since neglecting either renders advances in the others largely useless. In carrying out the war-planning theme to which a major part of this issue is devoted, power and maintenance therefore are given prominent places. But no major element in management and operation is slighted in this roundup of suggestions designed to help executives and operating men meet the problems of the day.



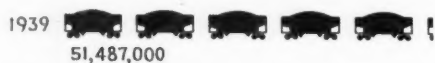
Upward trend in business activity reflects defense and war efforts.



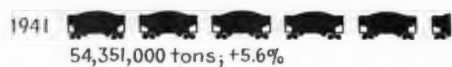
Bit. Coal Div. Dept. of the Int.



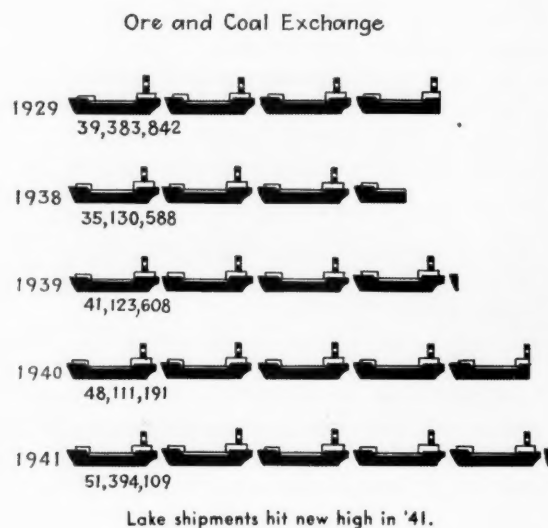
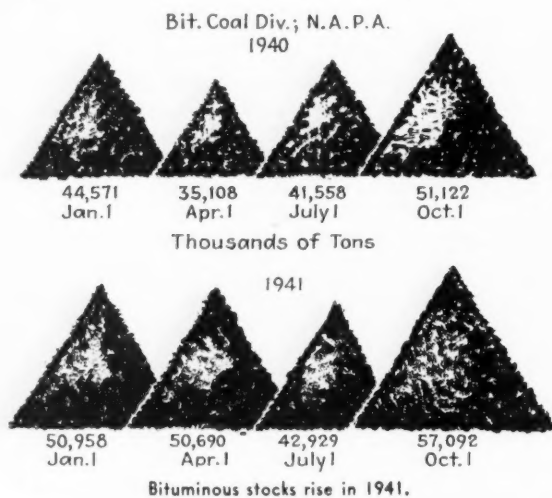
Bituminous output reaches highest total since 1929.



U.S. Bureau of Mines



Anthracite tonnage up 5.6 percent in 1941.



ENDING AN ACTIVE YEAR

Coal Starts Preparations For Fulfilling Its War-Time Obligations

REFLECTING the faster tempo of defense—now war—effort, both the anthracite and bituminous industries marked up substantial tonnage gains in 1941 and experienced a marked improvement in financial position. More headway was made on some fronts in the battle with substitute fuels, with domestic stokers, in particular, staging another major advance. The bituminous industry got more used to working under government regulation of minimum prices and marketing practices, while the anthracite industry's voluntary quota plan for stabilizing prices was officially sanctioned in new State legislation. Both industries negotiated new working agreements incorporating, among other things, vacations with pay and higher wages, and eliminating, in the bituminous industry, the day-wage differential between the northern and southern Appalachian groups.

New Problems Arise

But with advances in these and other directions, anthracite and bituminous producers faced a number of new and prospective problems growing out of the defense and war efforts. Perhaps the first to come up was obtaining equipment and supplies, with growing appreciation of the industry's part in the war effort in Washington resulting in continued revisions in the priorities set-up to insure the proper functioning of the mines. Manpower was another problem to come to the fore in a hurry, and now is a critical item, with car supply soon to be in the same category, if not already.

In distribution, hearings were still under way at the end of the year to determine the advisability of maximum prices on bituminous coal, while schedules prescribed for anthracite

by the OPACS, now OPA, were cancelled within a few days in September, although further action doubtless may be expected at any time. Rationing, zoning and kindred measures may be expected to come up for consideration in the not-too-distant future. Even now, many operators and government officials are agitating for increased storage to reduce seasonal peaks and enable industry to meet expected demands without excessive strain. A more detailed analysis of present developments and prospects in all these fields starts on p. 47, with views of representative operators on p. 50.

The 1941 bituminous output is estimated by the Bituminous Coal Division, Department of the Interior, at 502,860,000 net tons, an increase of 10.9 percent over the 1940 production of 453,245,000 tons but still less than the 1929 figure of 534,989,000 tons. The 1942 total, however, will be 550,000,000 tons or more if present trends continue.

Anthracite output, the U. S. Bureau of Mines estimates, was 54,351,000 net tons in 1941, an increase of 5.6 percent over the 1940 total of 51,485,000 tons. The best previous year was 1936, when the production totaled 54,579,535 tons. Early in the year, anthracite operators, Pennsylvania authorities and representatives of the United Mine Workers adopted a plan designed to end "bootlegging." This plan included, among other things, provisions that bootleggers be placed on the payrolls of legitimate producers, who would receive an addition of 3¼ tons per day on their production allowances for each man taken on. In addition, legitimate producers were empowered to purchase the production of outlaw holes until they were worked out.

The production control plan,

adopted by 99 percent of the industry on Jan. 29, 1940, and providing for estimating the tonnage requirements by weeks and then dividing the total among the signatory companies, was given the legal blessing of the State, already an informal participant, in legislation signed by the Governor on July 7, 1941. The law also extended the privilege of adopting voluntary plans to other Pennsylvania industries.

Anthracite operators and miners signed a new wage agreement June 20, the terms of which were agreed to on May 20. Running to May 1, 1943, the agreement included a wage increase of 7½ percent to Oct. 1, 1941, with 10 percent thereafter, and vacations with a token payment of \$20.

Study of anthracite price schedules was started by OPACS, now OPA, on July 26 and maximum prices were fixed by Leon Henderson Sept. 12. These schedules were revoked Sept. 18.

Coal Act Extended

Developments in the bituminous industry were touched off Jan. 26 by Senator Guffey with the introduction of a resolution to extend the Bituminous Coal Act of 1937 two years from April 26. Approval of such extensions was voiced by an advisory committee of operators and union representatives Feb. 21. A favorable vote was received in the House March 27 and in the Senate April 4. Operation under the act was featured by the opening of a hearing to redetermine costs as a basis for revising minimum prices on May 21, and the filing of a petition for the fixing of maximum prices by Luther Harr, Consumers' Council, on July 23. Hearings on the Harr petition started Sept. 9 and were still in progress at the end of the year. Earlier, however, maximum prices had been prescribed by OPACS on April 2 when operations

were suspended; revoked on May 1.

A split between northern and southern Appalachian groups was one by-product of the negotiation of a new working agreement in the bituminous industry in 1941. The Appalachian parley started in New York March 11, and work was suspended April 1 as a result of failure to reach an understanding by that time. On April 11, the southern group withdrew as a result of disagreement with the proposals that its 40c. day-wage differential be eliminated. At the request of President Roosevelt, the southern group agreed to return to work on April 28, this being the signal for all other fields to resume. On June 9, the southern group capitulated on the differential question to further the defense effort. As a result, the northern group signed June 19, although the signature of the southern group was not obtained until July 6 under threat of another suspension. On Oct. 18, Southern Coal Producers, Inc., was chartered in West Virginia as a separate bargaining agency.

With the Appalachian agreements settled, signing up in other districts got under way, although discussion of details postponed signatures for some time in a few districts. In Alabama, an agreement was reached only after the National Defense Mediation Board had intervened, on Oct. 24, to halt a stoppage in work, with the result that the men went back Oct. 27.

Wage Rates Increased

Provisions of the new Appalachian agreements, expiring March 31, 1943, and establishing the basis for revisions in agreements in other fields, included a basic day rate of \$7, compared with the old rates of \$6 in the North and \$5.60 in the South. Mechanical-mining men, however, received an additional boost of 40c. per day. Another new feature was a week's vacation with payment of \$20, which was set aside to help the defense effort in favor of a \$20 bonus.

United Mine Workers attempts to extend the "union shop" to captive mines operated by steel companies resulted in a suspension of work at these properties Sept. 15. A 30-day truce was effected Sept. 19 and the men returned on Sept. 22, only to go out again on Oct. 27 until Oct. 30, when John L. Lewis accepted a plea for mediation by President Roosevelt. This was followed by another work stoppage Nov. 17, which ended Nov. 22 when Lewis accepted an arbitration proposal. The three-man board, made

up of Lewis; Benjamin F. Fairless, president, United States Steel Corporation; and Dr. John R. Steelman, director, U. S. Conciliation Service, who resigned temporarily to represent the public, voted 2 to 1 Dec. 7 in favor of the union, thus settling the question, as both sides had agreed to be bound by the decision.

On the distribution front, developments in 1941 included a request for a rate increase filed by the railroads on Dec. 13 as a result of a wage increase. Steps to take care of transportation, distribution and kindred problems to be expected as a result of the war effort included appointment of Harold Ickes to the post of "Solid Fuels Coordinator for National Defense" on Nov. 7. Mr. Ickes later named Howard Gray as acting director of solid fuels coordination, and on Dec. 18 solid-fuels men accepted a proposal to form a 17-member committee to serve with the director.

Coal Favored in Sales

Both bituminous coal and anthracite benefited by developments in the sales field in 1941. The record, as far as data are available, is shown graphically on pp. 44 and 48. Stoker sales, it will be noted, advanced 24.5 percent, against a 3.6-percent rise in oil-burner shipments to the U. S. Oil, however, ran ahead of coal in the railroad field, while the opposite was true in the utility field, where natural gas also failed to make as great a gain as coal, the latter benefiting in addition from a scarcity of water in many parts of the country. Over-all natural-gas sales, according to preliminary figures by the American Gas Association, rose 11 percent in 1941, with domestic sales down 0.6 percent and industrial sales up 18.8 percent.

Increased pig-iron production resulted in an 18.3-percent rise in coal for this purpose, while coal for "other industrial" purposes marked up a 10.3-percent gain. Lake shipments hung up a new record of 51,394,109 tons. Bituminous stockpiles also showed a rise.

Induction of the coal industry into the priorities set-up took place on June 30, 1941, when mining was included in a group of 26 "essential" industries given priority status on repair and maintenance materials and equipment necessary for uninterrupted operation. However, no actual power to use the prescribed A-10 rating was given until later. On July 29, Order P-23 assigned an A-3 rating to selected manufacturers to purchase materials

for the production of mining equipment, and on Nov. 30 this order was continued in effect until Dec. 31. It then was superseded by P-56-a, effective until further notice, continuing the blanket A-3 rating. On Dec. 2, Order P-56 was amended to provide that the benefit of the A-3 rating may be extended by the mine operator to any supplier of his choice, and the supplier in turn may extend it to any sub-suppliers, if necessary, to insure delivery. Although no definite line of separation has been established, OPM requires that orders for equipment involving a substantial cost and large volumes of materials first pass through Washington for approval. The priority numbers also are used by the supplier of either equipment or materials to support requests to OPM for replacements of material used.

Parts Given Special Status

Mining soon was given special status in obtaining repair parts and materials and supplies in the form of a P-56 order, effective Sept. 22, stepping up the general rating from A-10 to A-8. On Dec. 2, Order P-56 was amended to carry an A-3 rating for repair materials for certain types of mining equipment and an A-1-a rating on emergency needs upon application to OPM. Previously, the original P-22 order implementing the June 30 order had been modified to permit the buyer to certify that his order came within the scope of the regulations, thus eliminating the flood of requests for individual priority ratings which threatened to swamp Washington under the original set-up. Along that line, the P-56 order of Sept. 22 provided for the appointment of "coordinators" in each State to compile lists of active operations to which serial numbers, to be placed on all orders for materials, were assigned by OPM. With amendments increasing the scope of the materials and equipment covered and continuing or including the A-8 blanket rating, the A-1-a emergency rating, the A-1-c rating for material kept on hand in anticipation of breakdowns and the A-3 rating for certain items of equipment and the repairs therefor, the order was continued from Dec. 31 until revoked.

D. L. McElroy, head, West Virginia School of Mines (on leave), was appointed technical advisor for coal priorities, and is in charge of the coal section of the mining branch. He is assisted by J. L. G. Weysser, formerly of the University of Illinois.

Planning for War

THE YEAR 1941 is now history. In 1942 and future years, until final victory is achieved, the coal industry is faced with the task of producing a vital raw material in sufficient quantities to supply the country's needs for both war and non-war uses. More coal is now the major consideration, and it must be gotten under less comfortable circumstances. Consequently, aside from the questions of realization and distribution, the industry must solve the problems of meeting manpower drains, securing equipment and supplies necessary for peak production and keeping equipment already in productive service in full-time operation.

The task ahead is not a little one, as the following observations, distilled from conversations with government officials, expressions of opinion by coal-mine executives and a survey of developments in the last war, clearly show. These observations, it should be noted, make no attempt to do more than reflect opinion at the moment and should be considered with that idea in mind. However, they do indicate clearly that planning and cooperation are more vital now than ever.

Planning and cooperation within the industry itself, and with its employees, is no small part of the job ahead. Even more important is planning and cooperation with government authorities to the end that measures adopted for maintaining manpower, keeping equipment and supplies flowing, utilizing available transportation facilities to the best advantage and distributing available coal supplies, if and when restrictions become necessary, will work the least hardship on all concerned. One of the first tasks of the industry should be getting such planning and cooperation under way at the earliest possible moment.

Prices, Taxes and Profits

Total war, in which the United States is now engaged, inevitably means substantial modifications for the duration in the usual system of doing business. Adoption of price ceilings is one such modification. Machinery for the establishment of maximum bituminous prices was included in the Bituminous Coal Act of 1937 and was set in motion by the Consumers' Counsel July 23, 1941, with hear-

ings still continuing at the end of the year. Temporary ceilings previously had been set by OPACS, now OPA, during the suspension resulting from failure to agree on a new Appalachian contract before expiration of the old. Ceilings also were prescribed for anthracite prices by OPA in September, but were revoked after a few days.

With the list of commodities on which maximum prices have been established growing steadily, there is every reason to expect that coal will not be long exempt. How well any ceilings which may be prescribed will accomplish the purpose of avoiding undue hardship on both producers and consumers will depend upon the care with which they are established and the provisions made for their future adjustment—especially the latter.

With a ceiling on prices, the squeeze begins with rising prices of materials and equipment, rising labor costs and higher taxes. Probable imposition of ceilings on costs of material and equipment not already subject to such restrictions will limit the squeeze from this direction. Wage rates in the coal industry are fixed by agreement expiring in 1943, but nevertheless more overtime, more hand production to meet increased demands for coal and other factors may be expected to result in a trend toward higher costs.

As for taxes, higher and higher is the forecast. Few will realize more than a modest return in this war if the present trend continues, which it undoubtedly will. Among the straws in the wind, if the last Presidential budget were not sufficient indication, is the statement of Leon Henderson, OPA, in the January issue of *Factory Management & Maintenance*, that higher corporate income taxes would not be regarded as a justification for price increases. "Income taxes," he declared, "are not costs in any real sense of the word; they are a levy on profits, so that if you make no profit you pay no tax. . . . We believe that the only cost increases which should be considered a justification for price advances is an actually realized increase in per-unit cost resulting from increases in wage rates and material prices. These increases must be actual and not anticipated increases. Furthermore, evidence must be supplied to show that a wage-rate in-

crease that has taken place has resulted in a higher cost per unit."

So a golden flood need not be expected. Nor, it is safe to say, is it desired. But national interest dictates that the coal industry realize a return sufficient to enable it to keep its plants and equipment in efficient operating condition, take advantage of opportunities afforded by new methods and equipment, expand production as necessary and, if possible, make some preparations for post-war readjustments. It seems indicated, therefore, that the industry should give thought, among other things, to:

Preparations for close cooperation with government authorities, when the time comes, in setting up maximum price schedules and, particularly, establishing a system for their readjustment when necessary.

Preparations for higher tax levies. As a corollary, the industry also should be prepared to assist in suggesting economies in less essential expenditures and in expenditures for State and local services.


Manpower

Coal mining began to feel the pinch of labor shortage, particularly in skilled classifications, even before the Selective Service System began operations. This shortage now has reached a stage bordering on the acute. Unless immediate steps are taken, conditions may be expected to get worse as the demand for coal increases and more men are inducted into the service or switch to other industries making more attractive offers.


"Selective service in total war," declares Brig. Gen. Lewis E. Hershey, director, "is not going to deviate from the fundamental principles which governed its operations during the peacetime training period. Men will continue to be deferred from military service when they have dependents. Men will continue to be deferred from military service when they are 'necessary men' and are difficult or impossible to replace.


"However, management and industry must recognize that the man who is deferred as a necessary man is deferred temporarily and each employer has the responsibility to secure and train replacements for deferred men who are physically fit and otherwise would be available for military service. . . . There is an adequate supply of replacements for necessary men among those who are physically unfit for military service, those who are presently deferred because they have dependents, those who are above the

1940  Coal - 80,455,720 tons


 Liquid fuel - 61,184,420 bbl.





1941*  Coal - 92,000,000 tons; +14.4%

 Liquid fuel - 74,500,000 bbl.; +21.8%
*Partly estimated. I.C.C. data
One barrel oil equivalent to 4 tons of coal


Oil runs ahead of coal in railroad field in 1941.


1940  Coal - 53,348,131 tons


 Oil - 16,771,809 bbl.

 Natural gas - 183,157,400 Mcf





1940  Coal - 64,400,000 tons; +21.6%

 Oil - 20,000,000 bbl.; +19.2%
1941*

 Natural gas - 203,400,000 Mcf; +11.1%
*Partly estimated. F.P.C. data. One ton coal equivalent to 25,000 cu.ft. gas

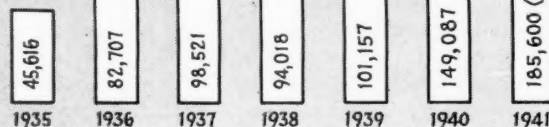
Other fuels lag behind coal in utility field.

1940  144,870,000 tons

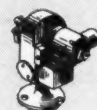
1941  160,000,000 tons (partly estimated); +10.3%
U.S.B.M.; Bit. Coal Div.; N.A.P.A. Includes that part of coal changed to coke ovens not represented by coke use in pig-iron production.

Coal for general industrial use (steel and rolling mills, coal-gas retorts, cement mills, "other industrials") shows 10.3-percent gain in 1941.

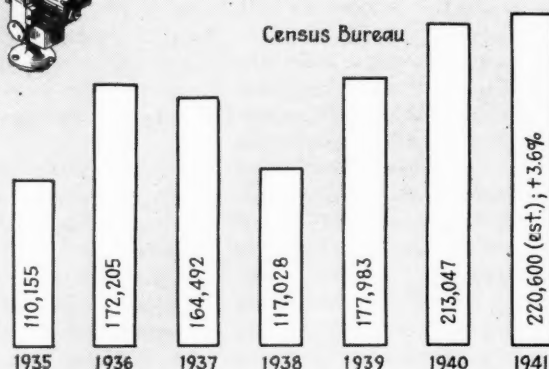
Census Bureau




Factory sales of Classes 1, 2 and 3 stokers show a 24.5-percent increase in 1941.




Census Bureau

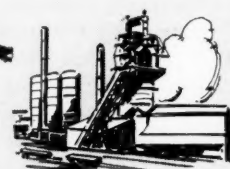


Oil-burner shipments to U. S. (excluding large boiler- and furnace-burner units) increase 3.6 percent in 1941.

1940  60,000,000 tons (est.)

1941  71,000,000 tons (est.); +18.3%

Coke used in making pig iron up 18.3 percent.



age liable for military service—45 to 65—and in many cases among the women of this country.

"Employers must be honest and sincere in their requests for deferments and must limit such requests to cases of men who are in fact necessary. No industry or activity, no matter how closely identified with national production for war, can ever become a refuge for those who seek to avoid their obligation to their country in its hour of need."

But while Selective Service is one thing, departures to other industries is very much another. What, if anything, can or will be done about migration from job to job still is a question. In the last World War, coal was the only industry to be favored with a Presidential proclamation declaring it the patriotic duty of mine employees to stay on the job. Such action should again be taken now, in World War II. Unwarranted layoffs and absenteeism also take their toll of the industry's productive capacity and must be reckoned with.

Measures which might be taken to compensate for a scarcity of men include the increased use of mechanical-mining equipment, although this in turn entails a higher proportion of skilled operators and maintenance men. It seems likely, however, that the supply of such equipment will be somewhat limited for the duration. An alternative might be a return to some transitional type of machine, such as the pit-car loader, which is simple and cheap to build and provides a moderate increase in efficiency, although nothing to compare with certain other types of equipment.

Lengthening the work week and the hours worked per shift is another method of alleviating a possible shortage of labor. Keeping men from getting hurt or killed also will prove a substantial help. From the manpower standpoint, therefore, consideration must be given, among other things, to:

Securing and training new men as soon as possible to replace those subject to military service.

Mechanization of loading and other operations as fast and as fully as possible, and consideration, where the usual equipment is not readily obtainable, of the use of such transitional types as pit-car loaders.

Participating in a joint undertaking with the union for the suspension of present restrictions on hours and days worked for the duration.

Working with mine employees to reduce unwarranted layoffs and absenteeism.

Working with mine employees and government authorities to reduce departures to other industries.

Putting forth every effort to make mines safer and thus prevent injuries and deaths from reducing available manpower. Steps which might be taken to this end were the subject of a special safety section (pp. 63-80) in the December, 1941, issue of *Coal Age*.

Utilizing Producing Facilities to the Fullest Extent

Mining properties and equipment now in operation, it is confidently believed, can produce all the coal the nation will need in the coming year—IF materials and supplies, manpower and transportation are available and demand is spread more evenly over the period. However, everything will have to click, while 1943 and succeeding years present still another problem. At the moment, no one can say just how much the demand for coal will increase after this year, but it undoubtedly will go up until we reach the level needed to maintain our war effort.

Some regions are in better position than others to accomplish substantial increases in output, provided they get a break in the directions noted in the preceding paragraph. But in all regions, both to take care of possible increases in future requirements and also compensate for the seasonal variations which doubtless will continue, although perhaps reduced in magnitude, consideration should be given to placing every machine and possible bit of working territory in position to produce. This, of course, brings up the questions of manpower and working time, but if these problems can be ironed out, thought should be given, among other things, to:

More multiple shifting of plants and equipment.

Improvements or revisions in maintenance and working practices to make spare machines available for service and keep active machines working more of the time.

Redesign of equipment, such as cutting machines and the like, to increase its capacity.

A study of mine operations to better balance machines from the standpoint of working capacities so that none will stand idle awaiting others.

Improvements in power service to insure proper voltage and energy supply at the face, thus insuring that machines work at rated capacity and are less likely to be taken out of

service because of electrical troubles.

A survey of present working territories and reserves to make sure that all are in position to produce at the maximum rate.

Checking recovery per acre to insure that the maximum benefit is secured from territory in production.

Development of plans for bringing new producing capacity into being when and if called for with the least strain on the present operating organization and on present and future financial set-ups.

Equipment and Materials

Equipment, materials and supplies, no less than manpower, are the life-blood of coal mining. OPM, available evidence indicates, is disposed to see that the industry gets all the necessary items of this character it may need to keep the coal coming and expand production when and as much as needed. But if the industry is to derive the maximum advantage from this attitude, it is suggested that it plan ahead as far as possible and attempt to get some idea as to its future requirements rather than place the entire responsibility on a priority number. True, the priority number is supposed to do the job, but in the general scramble for materials by all consumers, the industry which gives its manufacturers and suppliers and OPM the best idea of what it will need will stand the best chance of having a priority number or numbers that will mean something.

Economical use of materials, salvage, and prevention of destruction or loss now take on added importance, along with the problem of finding and using substitutes for those in greater need elsewhere. To improve the whole equipment and materials outlook, therefore, consideration might be given, among other things, to:

A survey, by each operator, of future needs for equipment for transmission to manufacturers or OPM or both.

A survey of stocks of parts and materials on hand and of possible future needs, both to insure economical use and for transmission to manufacturers and suppliers or OPM, or both.

Revision of methods of storing, issuing and using parts and materials to insure economical use and prevent destruction or loss.

Improvements in provisions for salvaging of materials and parts, their reworking if necessary, and their adaptation to other uses if unfit for their original duties.

A study of the possibilities of using substitutes for certain materials, such as wood for steel in roof support, tracklaying, pipelines; concrete for construction and roof support, etc.

Transportation and Distribution

Ability to produce is only part of the problem of meeting the needs of coal consumers. Transportation to the point of use is equally important. To date, available evidence indicates, transportation facilities have been equal to the task, but it also seems likely that shortages may not be far off, particularly in seasons of heavier demand. Realization of this possibility underlies increased emphasis on storing by operators and government representatives. How far the government is prepared to go in promoting storage still is speculative, but one suggestion

is that, in addition to increased storage by consumers with the necessary facilities and more stocking at the mines, where possible, the government also should consider the question of storage for its own purposes as well as for public use.

How far the government is thinking about going into control of distribution practices, including such items as rationing consumers, zoning of shipments, etc., also is speculative. But action doubtless will be taken as soon as, and perhaps even before, the pinch is felt either in coal supply or transportation. But indications are that it would be a good idea for the industry to start thinking along those lines if the straws now in the wind are to be depended on. Consideration therefore might well be given, among other things, to:

Getting over to consumers the ne-

cessity for increasing stockpiles while transportation and producing capacity still are available, and for distributing purchases more uniformly over the seasons.

Increased storage of coal at the mines.

Enlistment of government cooperation, if possible, in storage of coal for both its own and public use.

Cooperation in programs designed to keep railroad cars and other transportation equipment moving as much of the time as possible.

Survey of present preparation practices to see if distribution could be facilitated by reducing number of sizes.

Preparations for cooperating with government authorities in any program for rationing, zoning and control of distribution which may be found necessary.

GIRDING FOR THE WAR EFFORT;

What Coal-Mine Presidents See As the Big Problems in Future Operations

WHAT are the biggest problems facing the coal industry in the war effort? What can be done about them? These questions were put to a selected group of coal-company presidents in a telegraphic survey made by *Coal Age* in January. The text of the inquiry was as follows:

"Please wire briefly night press rates collect what you consider is coal's biggest problem in the war effort and how it should be met, for publication in our February issue."

The replies revealed substantial unanimity of opinion on a number of questions. Preventing loss of manpower was one of the major problems shown up by the survey. Perhaps equally important was prompt delivery of materials and repair parts in sufficient volume to keep the industry

operating at capacity. Related questions included training of new men to replace unavoidable losses, relaxation of restrictions on the time a miner can work, with a number suggesting an eight-hour day and a six-day or longer week. Preventing layoffs was another point brought out by a number of executives, while some were of the opinion that overtime payments for the extra days or hours should be eliminated.

The need for improved maintenance methods was stressed by several executives replying to the inquiry, with more attention to salvage of materials and kindred matters also suggested. Keeping up the supply of transportation was a point frequently emphasized, with a number of operators advocating the encouragement of stocking and foresight in coal pur-

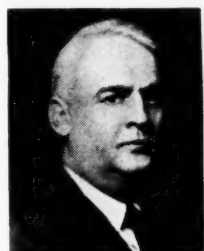
chases to reduce seasonal peaks and diminish the burden on the carriers. The individual replies on these and other questions read as follows:



The coal industry should act through the Solid Fuel Coordinator's committee to assure an adequate supply of fuel in the manner best calculated to relieve the burden on the railroads through the elimination of cross hauls and insuring, as far as possible, return loads for the empty coal cars. This committee, however, should be very zealous regarding the fuels position after the war. The anthracite industry, as an

instance, lost its markets in the last war through being zoned out of its Western markets, and it is easily possible that competing industries such as oil and gas may seize the present opportunity to make further inroads in the solid-fuel territory. The industry must likewise avoid overexpansion. Intelligent planning on the part of the solid fuel committee and the coordinating of its efforts can prevent a disorderly and unnecessary expansion of facilities and new plants which would be demoralizing when the emergency is over.—JAMES H. PIERCE, *East Bear Ridge Colliery Co.*

I think the biggest problem facing anthracite coal in the war effort is to educate the consuming public to keep at all times a large supply of fuel in their bins and to take advantage immediately of the transportation facilities which are now available but may be severely curtailed in the very near future. There is too much seasonal buying, which creates a feast-or-famine condition.—JOHN C. KEHOE, JR., *Kehoe Berge Coal Co.*



The coal man's problem at this time, like that of every other good American, is to win this war with the least loss of lives to the end that we may live in peace and freedom

under the form of government intended by the framers of our Constitution. That our men should be dying and our nation humiliated for want of weapons and munitions that could have been purchased with the millions that have been and are even now being wasted for vote-getting purposes is a national disgrace.

We need to declare a moratorium on politics and an open season on those so intimidated by blocs, classes or groups as to be afraid to vote or act according to their convictions, and who are thinking more about their own reelection than the safety of our country and those fighting for us—including them. Moreover, the profligacy in expenditure for non-war purposes is having a very definite effect on the general morale of the American people. Our own people will gladly work, save and sacrifice, and give and pay all necessary taxes if our elected representatives at Washington will stop wasting money for non-war purposes.

This is a war involving the making

Meeting the expected war-time demands for coal, in the opinion of coal-mine executives, involves a number of problems, with several dominating the thinking of the majority. These are:

- **Maintaining manpower, especially supervisors, engineers, mechanics, electricians and other key men.**
- **Training of new men to replace those unavoidably lost.**
- **Relaxation of restrictions on the time a miner may work.**
- **Prompt service and an adequate supply of materials and repair parts.**
- **Better upkeep of equipment.**
- **Adequate car supply.**
- **Encouragement of stocking and foresight in coal purchases to reduce seasonal peaks and reduce burden on transportation facilities.**

of planes, tanks, ships, guns and munitions on an enormous scale, for which American industry is particularly adapted, and if given a chance, under competent, undivided control at Washington, there can be no doubt of the result.

The coal industry has been and is doing a splendid job during this emergency, and if permitted to function in its normal way and the necessary car supply, materials, labor and key men can be secured, or retained, it shall not be found wanting.—CHARLES C. DICKINSON, *National Coal Association.*

Production and transportation are coal's biggest problems in the war effort. The problem of production can be met only by complete cooperation of labor and management, and likewise the problem of transportation will require the fullest cooperation of producers and railway companies.—MALCOLM. McAVITY, *Consolidation Coal Co.*

I think it is entirely obvious the largest questions for the coal industry will be labor and transportation. If they remain ample and the coal industry is not entirely deprived of necessary mine supplies for operation, the country should not suffer for lack of ample fuel.—ARTHUR B. STEWART, *Davis Coal & Coke Co.*

No problem producing the nation's requirements if car supply and transportation are adequate.—J. H. MILES, *Akron Coal Co.*

As always, coal's biggest problem is car supply. There is plenty of coal available for all the requirements of the country during the war effort, with the possible exception of high-grade coking coals, particularly in the Connellsville coke region. This district is gradually becoming exhausted. If beehive coke is to be maintained at present levels, coals from other districts will have to be transported to the ovens, which, of course, will make the cost of producing the coke much higher, as approximately 1.6500 tons of coal would have to be shipped for each ton of coke manufactured, and the beehive ovens cannot sell smoke. Steam coal of all grades will be readily available throughout the entire period if transportation is at hand. This by no means should deter the consumer from carrying a reasonable stock, as breakdowns at coal properties are going to be extremely hard to repair promptly because of the great shortage of materials that may be required.—C. S. B. WARD, *Commodore Coal & Coke Co.*

I believe the biggest problem for the coal industry is getting the necessary supplies to maintain equipment and for new equipment to properly maintain our product and our tonnage. I don't anticipate any serious labor shortage, although in our mechanically equipped mines it will be necessary to exempt from the draft many of our most competent mechanics to keep running on an efficient basis. Tire rationing and the rationing of other products may become serious if coal is not given a full defense status.—ANDREW B. CRICHTON, *Johnstown Coal & Coke Co.*

In my opinion, coal's biggest problems in war effort are securing necessary mine supplies and maintaining adequate trained personnel. This could be accomplished with more leniency from draft board in exempting trained men and more leniency in priorities covering necessary mine supplies.—S. B. JOHNSON, *Lorain Coal & Dock Co.*

Bituminous coal has no problem in the war effort other than observance of the existing contract by both labor and employer and maintenance of the present ample output. In order to maintain sufficient output to meet the needs of the nation it is necessary that an adequate supply of labor, materials and transportation be available to the industry.—JOHN M. JAMISON, *Jamison Coal & Coke Co.*



J. B. Morrow, president, Pittsburgh Coal Co., offers as his reply to the *Coal Age* inquiry an earlier statement on the subject of the problems facing the coal industry

in the war effort. This statement is reproduced below:

"We would like to express the opinion that the certain estimates are entirely too optimistic in tone in reference to the ability of the industry to increase production from 1941's 500,000,000 tons to 550,000,000 in 1942. We unhesitatingly predict that much more consideration than is indicated must be given to the industry's personnel problems if we are to produce the required tonnage. Our feeling is that the industry must establish the significance and importance of coal in the eyes of the public, particularly in its relations to the war effort.

"Pittsburgh Coal Co. had qualified three of its technically trained engineers for the War Department Reserve Pool. Complying with instructions from the office of the Undersecretary of War, we refiled on Dec. 22, 1941, a request for the continuation of their classifications as key employees. This morning we received notice that these classifications were revoked and they are now subject to call for active duty immediately. We have been particularly careful to not ask for deferment for any employees whom we did not believe to be vitally necessary to the maintenance of production.

"We feel that it is absolutely essential for the industry's spokesmen to prepare and present to the proper authorities the serious condition of the industry with respect to the importance of coal to the war effort, and the importance of trained key personnel to the industry.

"The rubber and automobile shortage will contribute to our problem, as most mines are isolated in the sense that motor transportation is necessary. If steps are not taken to protect miners, to insure their retention in their jobs, they will surely drift into occupations where other forms of transportation are available and our troubles will be further accentuated.

"While miners may adapt themselves to other occupations, the converse is not true. State laws govern

both the apprentice period for beginners and the service period for supervisors, so miners cannot be made in a day. We cannot, as in many other industries, develop these men in a relatively short training period. The peculiarities of mining—darkness, intermittent supervision, safety hazards—all militate against speed-up.

"If we do not proceed at once to present to authoritative sources the dangers inherent in allowing trained men to be separated from their present occupation in the efficient, safe production of coal, we shall be guilty of permitting our government to repeat the mistakes of the British administration which, to its great regret, allowed its coal industry to be shorn of its skilled men.

"If you have followed England's experience, you are aware that the coal industry was given insufficient consideration after Dunkirk, with the consequence that today the mine development is far short of requirements, coal is rationed and men are being released from the service in a costly effort to catch up.

"There is no question, of course, of our ability as an industry to meet the demands if—and I particularly want to emphasize the IF—we can be assured of being able to obtain the man-power so vitally necessary for production. I think we should be careful in comparing the conditions in the last war with those existing today. With the present advancement of mechanization and the concomitant necessity for greater skill in labor, engineering and management, we are facing a vastly different picture. We also think we should take into account the old proverb of 'not locking the door after the horse is stolen.'—J. B. MORROW, president."



Immediate establishing of base price of coal, deferment of men essential in mechanized mining, coordination of coal-producing areas in relation to consuming markets with transportation in view.—MARSHALL JOHN H. JONES, *Jones Collieries, Inc.*

Assuming car supply is adequate, decrease in labor efficiency and absenteeism our biggest problems. Union pressure needed to correct condition.—WHITNEY WARNER, JR., *Warner Collieries Co.*

In our judgment, the greatest threat to maximum production in the months ahead will come from deficiencies or delays in essential supplies, from a shortage of labor, particularly skilled mechanics, and from inadequate car supply. The order of importance of these will, of course, vary from time to time.—J. F. MACKLIN, *Heisley Coal Co.*

The greatest problem will be to secure supplies for necessary repairs to equipment and to hold or secure experienced miners. I do not anticipate any trouble in transportation.—R. M. HITE, *Va. & Pittsburgh Coal & Coke Co.*



I consider that coal's biggest problem in the war effort divides itself into three parts: (a) Convincing draft boards that key men, particularly in mechanized mines, are essential to maintaining production; (b) obtaining adequate priorities and delivery of the necessary mine supplies, repair parts and equipment to prevent the loss of operating time and maintain productive capacity; (c) to devise some means of simplifying the requirements as to reports and procedure as to hearings of the various government agencies so that key personnel will have more time to devote to the much more vital problems of production.—R. L. IRELAND, JR., *Hanna Coal Co.*

Our most serious difficulty, in trying to operate our mines efficiently during this emergency, is lack of experienced men to keep the machines operating as they should operate in a mechanical mine. A great many young men whom we have trained as mechanics are being taken by the Army, and we have to hire men who are not familiar with mechanical mines. We also are experiencing great difficulty in securing repair parts to replace machine parts which are broken or worn out. In the face of these difficulties of war-time operation, I am of the opinion that it will be hard to maintain our present cost. Unless these conditions can be remedied, the increased cost will naturally increase the selling price. As far as I can see, the only solution to this problem is complete cooperation between the coal industry and governmental agencies.—JOSEPH PURSGLOVE, *Pursglove Coal Mining Co.*

American coal industry's foremost problem is the preservation of its management of the production and distribution of coal on the basis of the intelligence which comes only from education and experience in the business. No need exists, or will exist, for artificial bureaucratic interference even in the temporary shortages, which are all that may occur, and risks must not be taken of throwing out of gear the whole production and distribution machinery by such theoretical panaceas as alteration of fuel supply, zoning, rationing, or like devices which have only hypodermic effect. Production, transportation and distribution facilities are not only adequate to present needs, which are at peak levels, but these can be expanded if let alone. Production conditions may need and should have sympathetic consideration because men and materials are both being drafted, but the interference of reform legislation should be suspended for the duration. Obviously the errors made by bureaucracy in the first World War should not be repeated and should be object lessons to all concerned—labor and management alike. The war must be won and coal must be allowed to perform its functions efficiently.—LAURENCE E. TIERNEY, JR., *Eastern Coal Corporation*.



If coal industry can secure needed supplies and not be interfered with by government agencies or committees and is supplied with transportation facilities it will produce all the coal needed for industrial and domestic use.—O. L. ALEXANDER, *Pocahontas Fuel Co.*

Coal's biggest problem in the war effort: Harmony between the miners and mine officials. Meet it by observing the Golden Rule. — W. GASTON CAPERTON, *Slab Fork Coal Co.*

Think our main difficulties will be in labor supply and transportation. Consumers must take their requirements regularly over the year and avoid peak demands. — HERBERT E. JONES, *Logan County Coal Corporation*.

Aside from the obvious need of continued flow of mine supplies and railroad cars, biggest problem is training of men in mechanical mining to maintain labor supply as ranks are depleted

by draft and enlistments. Can be met by individual company effort and by establishment of schools in each district. — ALAN J. SMITH, *South-East Coal Co.*

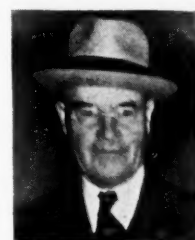
It is very possible for several matters to affect production of coal: transportation, shortage of labor, limited hours of work under our contract of 35 hours per week, inclination of men not to work full time. Present crisis calls for at least 48 hours per week for everybody. The mining industry cannot take ordinary labor and develop miners under one year's apprenticeship. The government must realize this and not take important men from the mines or run the risk of coal shortage. — C. A. CABELL, *Carbon Fuel Co.*

It now looks as if coal's biggest problem in war effort will be its ability to retain sufficient labor to produce needed war tonnage. We are advised that, so far, no exemption has been made for miners as being employees of an essential industry. Some few mines are already losing considerable number of miners for this reason, and we believe that coal tonnage has seen its peak production if this condition is not immediately remedied.—H. K. COOK, *Diamond Coal Mining Co.*

Biggest problem seems to me to be keeping mines working full capacity now, while manpower and railroad capacity are adequate, instead of waiting until next fall and then trying to produce enough for increased industrial needs, domestic requirements and lake shipment in a few months' time. Solution lies in convincing consumers of necessity for building up coal storage now, while coal is readily obtainable, and this can be accomplished by combined efforts of producers, railroads and government, giving publicity to probable difficulties of getting adequate coal promptly next fall and winter.—R. D. STOCKDALE, *Red Jacket Coal Sales Co.* and *Upper Buchanan Smokeless Coals, Inc.*

In my opinion, the biggest problem which confronts coal at the present time is the question of labor supply, particularly in the general classification of skilled mechanical men, and the ability of the industry to obtain necessary equipment replacements to maintain an efficient operating schedule. I believe that with cooperation from the government the ingenuity of the coal industry can meet these

problems. I also feel that it is highly important that supplies of coal be allowed to flow in their regular channels and that the requirements of industry be met by the consumer looking to the normal supplier for the fuel required. Up to the present time, with heavy demands being made, the coal industry has met the normal requirements of the defense program. The railroads have helped make this possible by a 100 percent performance in handling fuel. I believe that if each consuming area of the country is allowed to look to its regular source of supply there will be no disruption or failure of coal supply.—L. EBERSOLE GAINES, *New River Co.*



Coal's war problems have not yet materialized; merely a guess as to what may develop. So far, production and transportation have been adequate. Believe that the mines and railroads can fuel the nation provided demand is reasonably uniform throughout the year. Consumers and dealers, however, should maintain maximum stocks for safety and to assist uniform movement of all sizes. Our company problem is to realize cost of production from present market prices. Problems which may develop are, in following order: car shortage, labor shortage and lack of supplies of proper type.—J. E. BUTLER, *Stearns Coal & Lumber Co.*

Present problem of coal business is to find market for coal, due to dislocation of business consequent on changing over to war production by usual consumers of coal. No doubt this shortage of demand for coal will correct itself later on, but believe coal industry is amply able to supply all requirements and railways amply able to move the coal.—W. P. TAMS, JR., *Gulf Smokeless Coal Co.*

Now that the country is being made over completely into an arsenal for the democracies, as well as now being in the thick of the fight with our allies to abolish, once and for all, the militaristic and totalitarian powers now seeking domination of the entire world by conquest, and with all manufacturers now turning their plants completely over to the production of the necessary implements, arms and munitions of present-day warfare, the coal industry

stands ready to meet every need of the emergency in full force and effect.

However, in order to meet future demands, it will be necessary for consumers to build up their stocks of coal on hand while transportation facilities are available, for, as the "all-out" effort becomes more productive, equipment for transportation of coal will, in large measure, be curtailed.

Another problem of importance and necessity to the coal industry is the procuring of the necessary new equipment and machinery for replacement and expansion in order to keep up the present rate of production and be in position to increase the output when necessity demands. In order to hurdle this present-day obstacle, the manufacturers of mining machinery, replacement repair parts and miscellaneous supplies should be given blanket authority for priority manufacturing of such necessary machinery and items necessary to coal production during the present emergency.—STAN-LEE HAMPTON, *Tennessee Consolidated Coal Co.*

Consider coal's greatest problem in the war effort one of production and redistribution of tonnage. First step to meet the emergency, in my judgment, would be to increase work from 35 hours a week to 48 hours. Other major industries have already increased working hours to maximum—some as high as 160 hours per week.—CARL MCFARLIN, *Tennessee Products Corporation.*

Coal's biggest problem in war effort is maximum production, especially in coal used for metallurgical purposes, and in my opinion this can best be accomplished by thorough understanding and cooperation for their mutual interests and needs of the war on part of management and labor. This is general but it is also local. It also is my opinion this can better be accomplished on six-day week than on seven, especially in mines that are mechanically equipped, as there must be sufficient time for repairs.—E. J. ROWE, *Adams, Rowe & Norman, Inc.*

Without adequate coal supplies no nation can hope to engage in a war of any considerable magnitude for any considerable length of time. The uses to which coal is put in peace time are innumerable; in war time its uses are much more vital. The biggest problem confronting the coal industry during this emergency is to see that the employer of labor and the employee recognize the responsibility that rests

on this industry and that each agree with the other that for the duration of the war all controversial matters be subordinated to the needs of the government. To this program we have dedicated our facilities and our "all out" efforts.—J. W. PORTER, *Alabama By-Products Corporation.*

In my opinion, coal's greatest problem in the war effort is production restriction due to short work week imposed by labor union contracts and wage and hour law. Time-and-half wage rates for labor in excess of work week allowed by these agencies will not permit coal industry to maintain competitive position with other energies. The problem suggests the remedy.—A. R. LONG, *Brookside-Pratt Mining Co.*

Our opinion is that the securing of supplies and materials for maintenance of production of coal, together with securing of new equipment to replace obsolete and worn-out equipment, will be coal's biggest problem for ensuing years; secondly, if labor will cooperate efficiently with management to maintain equipment and production.—W. J. BORRIES, *general manager, Dawson Daylight Coal Co.*



The coal industry's biggest problem to maintain and to increase production is the prompt procurement of supplies, repair parts and replacements in order to avoid interruption in production. To accomplish this there should be: (1) the elimination of all possible waste at the mines, reclamation of materials, prompt sale of all scrap materials, and efficient supervision of the purchase and distribution of such items by the operator; (2) all the consideration possible by the government in its prompt allocation of these items by certified order or proper application by the operator.—T. C. MULLINS, *Northern Illinois Coal Corporation.*

It is my opinion that the coal industry has no production problems. Our mighty defense effort will, of course, add considerable boiler capacity and load existing boilers more heavily. A 10-percent increase in total coal consumption in 1942 above last year is, I believe, all that may be expected. We can meet this requirement or more. A problem may arise

in the matter of distribution if the railroads are unable to continue the excellent service they have given up to the present time. I believe that the matter of storage at destination is vitally important and every effort should be made to induce consumers to store heavily in the off-season period.—R. H. SHERWOOD, *Sherwood-Templeton Coal Co.*



Keeping key men on the job is one of the biggest problems ahead. Trained engineers, bosses, maintenance men and machine operators are essential for maintaining pro-

duction at maximum efficiency and capacity with maximum safety. Steps should be taken to halt the present and prospective drain on key men to insure that the coal industry can continue to meet war-time demands.—W. J. JENKINS, *Consolidated Coal Co.*

In the production of coal the things that are most necessary to insure a steady flow from the mines would be for the government to maintain its present good system on priorities on repair parts, replacements and supplies, and (2) to assure the mines of an adequate supply of cars for loading.—A. H. TRUAX, *Truax-Traer Coal Co.*



The coal industry's biggest problem in the war effort, in my opinion, is distribution and labor supply. There is ample capacity with existing mines for producing the requirements of this country during the war effort. Coal must be distributed evenly and railroad cars kept moving at all times.—G. DONALD COWIN, *Bell & Zoller Coal & Mining Co.*

Ample coal production available if uninterrupted, consequently maintenance becomes No. 1 problem. Supplies, repairs and replacement parts must be obtainable without delay to avoid curtailed output.—FRED C. MORGAN, *F. C. Morgan Coal Co.*

It goes without saying that the first obligation of the coal industry is to maintain the highest possible degree of productive efficiency to the end that sufficient coal shall be mined for all

purposes. Next, I believe one of its most important tasks is to fully and frankly advise the public through nation-wide publicity of its problems, its accomplishments and its plans for the future. Today more than ever the coal industry needs the intelligent support of a fully informed and friendly public opinion. — FRED S. McCONNELL, *Enos Coal Mining Co.*

Iowa coal industry is seasonal because Iowa coal is not suitable for storage except under certain conditions. Iowa coal's biggest problem is to persuade consumers in our natural market to anticipate needs so that Iowa mines' potential capacity may be utilized. This can be done by use of Iowa coal in off season while Eastern coal is stored. Iowa mines' wage structure is unfavorable to expansion of large Iowa mines because of large percentage of hillside mines. There should be increase in regular working hours as required.—C. T. CARNEY, *Scandia Coal Co.*

Coal's biggest problem in the war effort is the transportation of coal to the normal consumer. This can be best achieved by increased efficiency in the use of transportation equipment, curtailment of long hauls, zoning of production, etc.—J. R. HAMM, *Sunshine Coal Co.*

It is important that the mining industry be given a preference in regard to labor and supplies.—C. L. RUTHERFORD, *National Coal Co., Inc.*

Present legislation contemplates price ceiling on all commodities. It is vital that wages also be fixed. In view of anticipated car shortage, industry and the public should be advised to distribute shipments over entire twelve-months period.—R. G. JOHNSON, *Paris Purity Coal Co.*



We believe that the coal industry can meet its war-time responsibility of record-breaking production, but the big problem is to obtain this production at reasonable cost. A longer work week and more ready access to additional mining and preparation equipment and railroad cars would do much to solve this problem.—MORONI HEINER, *Utah Fuel Co.*

Coal industry's biggest problem in the national war effort is to produce

sufficient tonnage at a reasonable price for both producer and consumer to take care of the peak demand. This may become a serious problem with the high cost of materials and labor together with the difficulties in securing equipment, both new and replacement; also because of the shortage of labor at any price in certain districts accentuated by the young men going into the Army and Navy. I believe that the work-day week in the coal mines should be extended to six days per week without overtime during the emergency.—T. J. O'BRIEN, *Kemmerer Coal Co.*

In my judgment, coal's biggest problem in war effort is to secure (1) plentiful car supply; (2) abandonment of restrictive seven-hour day and five-day week; (3) reduction in needless multiplicity of coal sizes; (4) greater cooperation on part of consumer toward regular coal storage; (5) broader priority measures as to repair parts and new equipment.—L. R. WEBER, *Liberty Fuel Co.*



of Western coals to Middle Eastern markets, the Sheridan-Wyoming Coal Co., Inc., can produce, under its present mechanized system and with the same crew of men now employed, an additional 900,000 tons annually.—D. H. PAPE, *Sheridan-Wyoming Coal Co.*

Suggest that all artificial restrictions to limitation of production be promptly removed. This involves immediate adjustment of prices upward to meet last payroll increases; elimination of wage penalties as to overtime for a seven-day week, correlation of transportation, stimulation of financing and storage of coal during off-peak periods, provisions for an extended work week in this Western area, where enormous abnormal demands on the industry are too much for present working time capacity. The undersigned, representing the coal and associated industries of Colorado, pledges full support and cooperation within the limits of their ability for an all-out war defense effort.—CARL S. MILLIKEN, *secretary-treasurer, Coal Indus-*

try of Colorado, Inc. (Editor's Note: The preceding, representing the opinion of the organization's directors, was submitted in lieu of individual replies by a number of Colorado operators).



Coal's biggest problem here is need of more working time to meet heavy demand for both commercial and railroad fuel. Need six-day week eight hours per day with present government and union contract restrictions removed, as time and a half wages over 35 hours cannot be passed on to contract consumers like railroads. Time and half does not work out for miners paid on contract basis, as it would be difficult to separate coal loaded on regular time and overtime. Also means should be provided to discourage miners from laying off during the present five-day week. At least 90 percent of the employees would work the 48-hour week without consideration of time and half but for union officials and organizers who are constantly trying to create dissatisfaction among the workers.—SHARP HANSON, *Gallup Southwestern Coal Co.*

Greatest problem confronting Northwestern coal operators is 35-hour week. With the entire Northwest out of coal, severe weather would work great hardship. Forty-eight hour week on regular time needed. Time and a half causes many properties to operate at a loss. Conditions in this district not understood in Washington.—JAMES S. RAMAGE, *Continental Coal Co.*



Meeting the increased demand for coal for carriers and defense industries can be done by increasing work week from 35 to 40 hours, which is in line with the wage and hour act.—ALBERT GATELY, *general superintendent, Republic Coal Co.*

Coal supply exceeds the demand. Due to gas and oil substitutes, mines in this territory have been working broken time all season. Monthly output can be more than doubled.—G. J. JEFFRIES, *Jeffries Coal Co.*

WAR AND DEFENSE

Reanimate Anthracite Region Stimulating Production and Development

AT LEAST five reasons lie back of the increase in production in the anthracite region in the year just passed: (1) the sale of coke to steel mills, which, rushed with defense orders, bought up all the coke they could get, thus causing domestic consumers of coke to turn to anthracite; (2) increased construction of housing in those areas where anthracite is the natural fuel; (3) an oil scare resulting from a diversion of oil tankers to Great Britain, a symptom of coming stringency that made some people turn to coal; (4) the fear of a coal shortage due to an anticipated embargo of railroad equipment which induced domestic consumers to buy coal early in 1941 that otherwise they might not have purchased until the present year, and (5) a big demand for anthracite in Canadian and New England markets, which, however, applied also to 1940, a war condition due to the lack of foreign coal, for the ships crossing the Atlantic preferred to use water ballast because, when they used coal, it took a week instead of a day to turn around and put out for sea.

Other Factors Help

Three other reasons may have had their effect: (1) a shift in population due to greater activity in the East, (2) an undue waste of fuel because many of the people coming in for work are housed in dwellings not so well or so easily insulated as those in the communities from which they came, and (3) a decline in the production of "bootleg coal" due to the greater opportunity of the bootleggers to get work in the mines, to the Army draft which also reduced their numbers, to the legitimization of some of

Several causes, all relating to defense or war, gave anthracite a year of revival which may be carried over to the present year. Conservative progress marked 1941. Changes were made that promise economies for the post-war period. Active effort is being applied to the problem of how to clean the extremely fine coal for the market. Mechanization is extending widely wherever it finds that the coal does not pitch too heavily to supply it with a good toe-hold.

the production of the bootleg holes by a leasing of the land which the bootleggers had appropriated, and by the purchase by the lessor of the coal mined from such holes, and finally to the consequent entry of this bootleg coal for the first time into the duly recorded statistics of the anthracite industry. Inability to replace the tires on their trucks when they become worn will make the truckers of both bootleg and legitimate coal indisposed, at first, to deliver it at distant points, and later perhaps not at all. Eventually this may halt bootlegging.

Whatever the many causes, 1941 saw an increase in production of 8.7 percent in all-rail shipments, which improvement could not fail to stimulate development and which, fortunately, ended for the industry a period in which "corners had to be skinned" to avoid expense even at the risk of some inefficiency and of future reductions in operating capacity. And

in all this bettered condition, allocation helped mightily.

When, during the present year, business in the anthracite region became active so that it had an allocation of five days a week, it revealed that many of the larger companies could meet their allocated tonnage only with some difficulty, and it is likely that 1942 will show some important underground development, as only by such action can the need of these companies for tonnage be met. For years, development has been neglected, because the market has been declining, and the declining market in turn has masked the need for development.

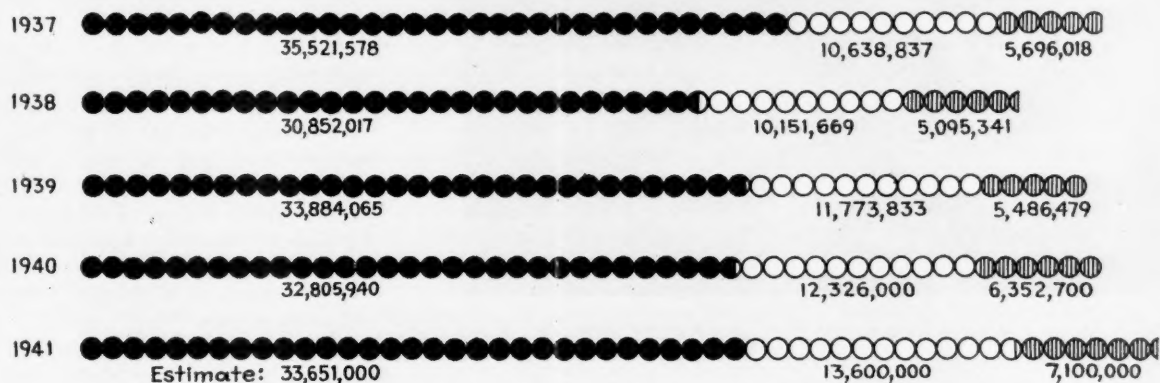
Strip Sources Narrowing

More and more of the coal has come from strippings, but this source is narrowing, though two big strippings, one at Locust Summit for the Philadelphia & Reading Coal & Iron Co. in the Southern region and one at Stockton for the Jeddo Highland Coal Co. in the Middle Eastern field, have recently been commenced. But the time approaches when the underground mines must furnish more of the coal, and deep virgin beds will be the principal source from which it will be obtained. Fortunately, mechanization furnishes the means by which such development can be speeded.

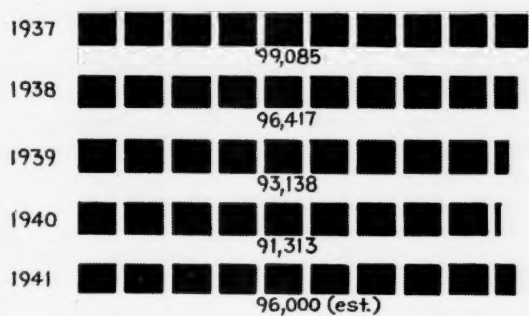
With a possible curtailment of automobile activity for lack of tire renewals, there will be less likelihood of an oil shortage along the Eastern seaboard, so the expected strong demand for anthracite and a heavy shift from oil to coal may not occur, though the present trend in favor of coal stokers may be expected to continue as the public becomes aware that coal as

ANTHRACITE OPERATING STATISTICS

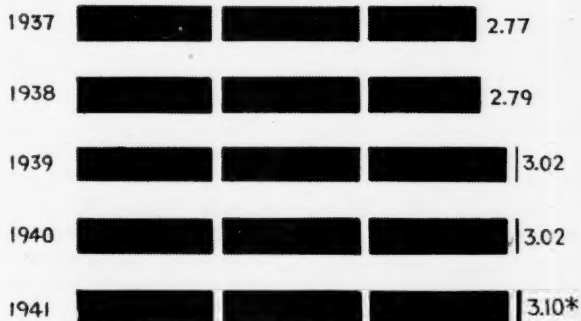
●●● Strip ○○○ Mechanically loaded ●●● Produced by other methods



Strip and mechanically loaded tonnage show upward trend in late years.

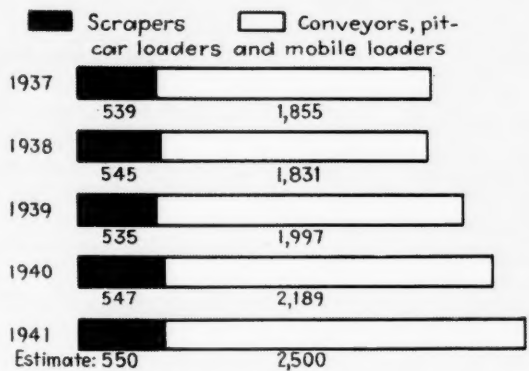


Men employed in anthracite mining.

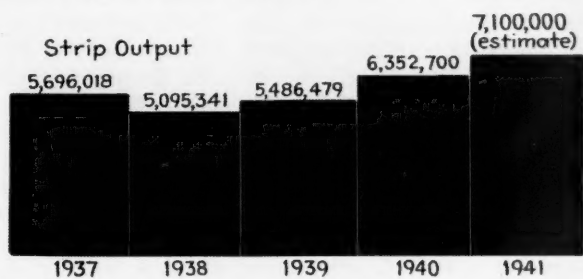


* Estimated

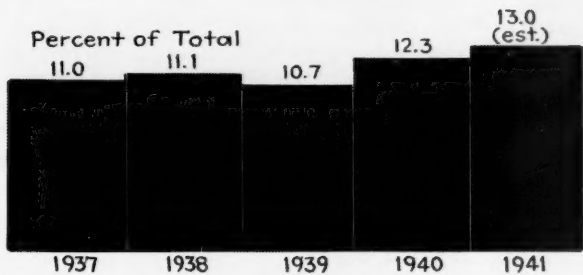
Output per man-shift shows upward trend.



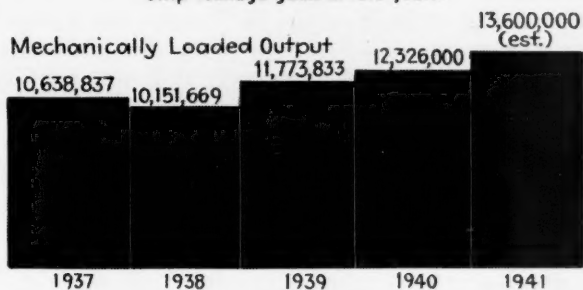
Mechanical-mining equipment in use increases.



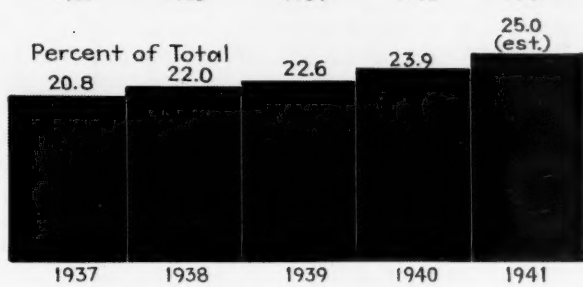
Strip Output



Strip tonnage gains in late years.



Mechanically Loaded Output



Mechanically loaded output rises.



Building up, by a metal spray from a metallizing gun, a pump piston rod, which has been worn down in service.

well as oil can be burned in that manner and its combustion be as satisfactorily regulated. The Anthracite Industries Laboratory wisely is preparing for such a shift and is trying not only to make the use of coal more desirable and satisfactory for the large and small householder but also to make a transfer from oil to coal as inexpensive and as easy as possible.

In western New York, the lack of natural gas also is favoring the use of coal. Just in which direction the several contrary tidal movements will carry the anthracite industry is not quite clear and assured, but the anthracite operator will be well advised to prepare conservatively for a much more favorable market so as to be ready, if and when it comes.

Plants Resume Work

The favorable trends doubtless caused the Glen Alden Coal Co. to resume work at No. 9 colliery, Sugar Notch, Luzerne County, some time in January of last year, followed by Avondale colliery of the same company, near Plymouth. Both had been idle for some time; the Avondale plant for six years. Loree colliery of the Hudson Coal Co. is another plant that will swing back into production. A steel headframe at the Baltimore colliery that had covered itself with a layer of rust was sandblasted, painted and moved to the Loree plant to serve its future needs. Illustrating the interdependence of industry, the sandblasting contract fell to a gravestone manufacturer who successfully used for that purpose equipment that had been developed for the sandblasting of letters on tombstones.

The upper 40 ft. of the Loree No. 5 shaft passes through wash and has to be timbered skin to skin. Its timbers

have been cut to the required dimensions and then creosoted and are now being installed. This mine, which will be thoroughly mechanized, will have 20 Goodman shaking chutes at the start of operations and more units will be added later. An example of the hand of time on some of the old mines was the demise of the old Suffolk colliery of the Philadelphia & Reading Coal & Iron Co., which was opened in 1860.

During the year, one mobile loader was purchased in the anthracite region; none was bought in 1940. Conveyors sold in the past year numbered 330 as against 189 in the previous year. Scraper sets sold were only three; the same number was sold in the year 1940.

Mechanization is bound to become more general, for the more level and thinner coal that now must be mined makes the machine handling of coal more essential, and the greater pressures with depth make desirable the speedy development, the rapid retreat and the narrowing of operational activity that mechanization so satisfactorily assures. One company is anticipating the use of shuttle cars despite gradients of 12 to 22 deg. This will be the first mine to haul coal on rubber in the anthracite region, and will break precedents also in tackling unusual inclinations.

Mechanical loading and transportation by conveyors has been undertaken in the main by the smaller operating concerns, but this greater apparent receptivity on the part of the small operator to new ideas is due to the fact that, unlike the larger companies, he has no coal that pitches steeply enough for loading by gravity. One big producer long ago, on acquiring a big acreage of pitching coal,

shut down the old mines which had only flat-seam coal, and others of the bigger companies have disposed of most of their level and thinner coal by lease. The lessee, on taking charge, had no other recourse except to conveyorize his mines.

But two of the larger companies with thick and pitching coal are again introducing mobile loading machinery in a tentative way where the pitch is not too heavy, and the area of flattish coal is large enough to justify the purchase and installation of the necessary equipment. One large company which has no thick pitching coal is producing 85 percent of its product with the aid of conveyors.

Difficulty in getting equipment is likely to make the anthracite region more anxious to make good use of what it has, and the rush to get steel wheels retreaded duplicates the anxiety which has arisen throughout the country for the recapping of rubber tires, now that new tires are almost unobtainable. One company, the Moffat Coal Co., has introduced a Westinghouse automatic tire welder for restoring the treads of its wheels but more are depending on repair shops and manufacturers for such work. One of these has recently enlarged its facilities.

Shops Aid Car Repairing

Outstanding among the developments are the car-repair shops which the Hudson Coal Co. is building at its mines. In a sense, these will be central shops doing the work for two nearby collieries where two can be found near enough together. The first of these was described in *Coal Age* in the preceding issue, p. 47. Its second track is to be removed, as it is found that it is not needed. By double-shifting the plant, the work can be done in four out of the six stalls and the other two stalls will be assigned to the sister colliery, the Delaware, for which no additional shop will have to be constructed.

The Olyphant repair shop will have only one track and will have eight stalls, also worked double shift, but, after six months, when the backlog of cars needing repairs will have been reduced and the more badly injured cars will have been repaired, the work can be restricted to five stalls working on a two-shift basis and the other three stalls can be assigned to Eddy Creek colliery.

Resistance welding finds its first application in the anthracite region in the shops of the Hudson Coal Co. at Providence, where, in the making of

shaking chutes, it is welding $\frac{3}{8}$ -in. steel to $\frac{1}{8}$ -in. steel at a fabrication cost almost half that with arc welding, including labor, welding material, and shop overhead (*Coal Age*, January, 1941, p. 55). In at least two anthracite shops, metallizing is being used for locomotive bearing housings, armature shafts, impellers and casings. This method of replacing metal worn away will be increasingly popular as the difficulty of getting new equipment in place of old increases, though the principle of "new lamps for old," old scrap for manufactured goods, that has been applied to copper, may be extended to steel.

Flyash Arrested

At the Coalbrook power plant of this same company, a centrifugal Whirlx flyash arrester has been erected in each of eight stacks to prevent any possibility of a dust nuisance in the town of Carbondale. It consists of a double helix in the lower part of a high cylindrical dust chamber. The dust falls in the dead space between the walls of the chamber and the helix, and slides by gravity through collecting pipes to the ash holder.

Having successfully shown the availability of anthracite as a fuel for melting iron in a cupola at the Providence shops, the Hudson Coal Co. has turned over the matter to Pennsylvania State College for a more complete test with thermocouples and similar equipment. In the belief of J. F. K. Brown, assistant general manager—engineering, of the company, there had been a disposition at earlier times to use too much coal and so to cool the charge unnecessarily, thus inevitably giving the impression that anthracite is not as reactive as coke. It is obvious that a volume of anthracite equal to that used with coke will cool off the melt, but so much anthracite is not needed, for that fuel will furnish more heat than an equal weight of coke and even more than an equal volume of that fuel. The experiments at Providence shops have given convincing evidence of the value of anthracite in cupolas, and what is true for the cupolas should be true also of the blast furnace.

Possibility of overloads on the electrical equipment is feared in the anthracite region. In the first World War, overloads of 20 percent and more were imposed for a long time, and much trouble occurred from coils burning out. That state of affairs has not been reached yet and may never be, but small overloads are being created.

At the mines of the Lehigh Valley, a new portable Haentjens pump of a deepwell type is being successfully used. It is made entirely of bronze and chrome steel but has a lignum-vitae bearing lubricated by water forced through the bore. The pump is 3 or 4 ft. long, and one man can shift it from one place to another with the guard around the motor dragging on the ground.

Most of the coal companies are looking ahead uneasily to the time when they will be required by the United States Government or the State to keep their fine coal out of the streams. In this connection, the Lehigh Navigation Coal Co. will soon complete the erection of a froth-flotation pilot plant at Lansford to recover fine coal from the wash water of one of the breakers, equipment for which was received in August of last year, but a strike and temporary transfer of men from Lansford to Tamaqua headhouse delayed the erection of the plant.

Prior to the planning and erection of this pilot plant, laboratory studies were made on the settling, flotation and dewatering of wash-water solids. Data on the settling characteristics of the solids were obtained for the design of the settling and classifying equipment. The relative value of various reagents in speeding settling rates were investigated. Tube settling tests were made to determine the overflow rates needed to classify the various sizes. A small cone was built and installed at the colliery to classify the clay slimes from samples for flotation studies.

Tests were made with laboratory machines to determine the flotation cleaning characteristics of this material. The important factors of particle size, flotation time, pulp temperature, pulp density, dispersion of fines and pH of the circuit were investigated and a study was made to determine suitable reagents for the frothing process. The results of these flotation tests are encouraging. Dewatering of the floated coal by settling, drain-

New Anthracite Preparation Facilities in 1941*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Adonizio Bros., Inc.	Keystone, Pa. (2)	140	Menzies ¹
Albert Hoke	Millersburg, Pa.	15	Deister Machine ²
Charles H. Eckert	Johnstown, Pa.	8	Deister Concentrator ³
Clifford Bressler	Pine Grove, Pa.	42	Deister Concentrator ³
Colitz Coal Co.	Pottsville, Pa. (2)	140	Menzies ¹
Cranberry Improvement Co.	Hazleton, Pa. (4)	260	Wilmot ⁴
Delano Anthracite Collieries Co. (Park No. 1)	Park Place, Pa. (3)	150	Wilmot ⁴
Dial Rock Coal Co.	Exeter, Pa. (2)	30	Wilmot ⁴
Donaldson Coal Co.	Goodspring, Pa. (4)	50	Deister Concentrator ³
East Bear Ridge Colliery Co. (Packer No. 5)	Girardville, Pa. (2)	540	Chance ⁵
Evans Coal Co.	Beaver Meadow, Pa.	18	Deister Concentrator ³
Gilberton Coal Co.	(Gilberton, Pa. (3))	250	(Wilmot ⁴)
Harry E. Coal Co.	(Gilberton, Pa.)		(Chance ⁵)
Hudson Coal Co. (Powderly)	Swoyersville, Pa. (3)	115	Menzies ¹
Hudson Coal Co. (Marvine)	Mayfield, Pa.	120	Link-Belt ³
Hydrotated Anthracite Fuel Co.	Scranton, Pa.	80	Wilmot ⁴
John Conlon Coal Co.	Lattimer Mines, Pa.	250	Chance ⁵
Jonathan Coal Mining Co. (Kulp)	Plains, Pa.	36	Deister Concentrator ³
Kohinoor Coal Co.	Paxinos, Pa.	8	Deister Concentrator ³
Lackawanna & Wyoming Valley Power Co.	(Girardville, Pa. (3))	200	(Wilmot ⁴)
Lehigh Valley Coal Co. (Hazleton Shaft)	Girardville, Pa.		(Chance ⁵)
Locust Coal Co.	Scranton, Pa.	14	Deister Concentrator ³
M. B. Stewart	Hazleton, Pa. (3)	740	Chance ⁵
Maryd Coal Mining Co.	Shenandoah, Pa. (2)	14	Deister Concentrator ³
Necho Coal Co.	Millersburg, Pa.		Deister Concentrator ³
No. 9 Coal Co.	Maryd, Pa. (2)	80	Wilmot ⁴
North Line Coal Co.	Donaldson, Pa.	30	Deister Concentrator ³
Paramount Coal Co.	Pittston, Pa.	25	Menzies ¹
Pennsylvania Coal Co. (No. 1 Dunmore)	Shamokin, Pa. (3)	45	Wilmot ⁴
Siekler Coal Co.	Archbald, Pa.	15	Menzies ¹
Steam Fuels Co.	Dunmore, Pa. (2)	50	Wilmot ⁴
Stevens Coal Co. (Spring Mountain)	Plymouth, Pa.	12	Deister Concentrator ³
Westwood Collieries, Inc.	Forest City, Pa. (2)	100	Wilmot ⁴
	Jeanesville, Pa.	40	Wilmot ⁴
	Jeanesville, Pa. (3)	470	Chance ⁵
	Tremont, Pa.	50	Wilmot ⁴

*Includes rebuilt plants and major installations of preparation equipment in existing structures. Where more than one unit of preparation equipment was installed, the number, if known, appears in parentheses after the plant address.

¹Menzies cone separator coal-washing equipment. ²"Plat-O" coal-washing table. ³Super Duty Diagonal-Deck" No. 7 or general-purpose "Diagonal-Deck" Deister-Overstrom coal-washing table equipment. ⁴Hydrotator coal-washing and classifier equipment and auxiliaries. ⁵Hydro-separator coal-washing equipment and auxiliaries.

⁶Chance sand-flotation equipment. To clarify rating figures, the Chance organization forwards breakdowns as follows: East Bear Ridge 16-ft. cone (broken to pea)—clean coal, 200 tons per hour; refuse, 150; total, 350; 12x12-ft. cone (buck, rice, barley and No. 4)—clean coal, 115; refuse, 75; total, 190; Gilberton (egg to buck)—clean coal, 150; refuse, 100; total, 250; Hydrotated Anthracite Fuel Co. (egg to buck)—clean coal, 150; refuse, 100; total, 250; Kohinoor (egg to buck)—clean coal, 120; refuse, 80; total, 200; Lehigh Valley 18-ft. cone (broken to pea)—clean coal, 285; refuse, 170; total, 455; 10x10-ft. cone (buck and rice)—clean coal, 80; refuse, 45; total, 125; special 10-ft. cone (broken, egg, stove and nut refuse)—clean coal, 75; refuse, 85; total, 160; Stevens 15-ft. cone (broken to pea)—clean coal, 185; refuse, 135; total, 320; two 8x8-ft. cones (buck, rice, barley and No. 4)—clean coal, 100; refuse, 50; total 150.

⁷Hydrotator coal-washing equipment and auxiliaries. ⁸Crushing installation and auxiliaries. ⁹Type D jig equipment.

age and vacuum flotation also was studied.

A level tank 140 ft. long with a sloping mouth at one end is favored by Paul Sterling, chief mechanical engineer, Lehigh Valley Coal Co., Wilkes-Barre, as a means of separating fine solids from water. A flight conveyor traveling at a speed of 15 ft. per minute sweeps the fine material along the tank and lifts it out by way of the sloping mouth. The tank is 4 ft. wide at the bottom and 12 ft. wide at the top. The fines are dropped alternately into one of two bins which are

emptied in turn as they are drained.

The year ends with no really large breaker construction but two are on the way—Packer No. 5 breaker of the East Bear Ridge Colliery Co. and the Hazleton breaker of the Lehigh Valley Coal Co., both having Chance equipment. The former will embody a new principle of operation. Difficulty in getting material for this new construction is making some delay inevitable. In the appended list of new cleaning units installed in 1941, much of the equipment is for coal of small size. It shows clearly how much is

being done to market the fine sizes and keep coal out of the streams. Ability to clean coal of "broken" size is provided at the two collieries mentioned and at the Spring Mountain Breaker of the Stevens Coal Co.

To prevent the possibility of silicosis from the use of sand on mine tracks, the Hudson Coal Co. is using iron-ore tailings in place of sand for locomotive braking. These tailings have a low percentage of silica. It is also introducing training classes with the idea of increasing efficiency and safety.

BITUMINOUS MINES

Improve Equipment and Methods And Prepare to Meet War-Time Coal Demand

PLACED by another major increase in mechanical loading and conveying equipment, improvements at bituminous deep-mining properties extended to all phases of operation in 1941, including preparation (p. 71). New fans and pumps were installed, new and larger locomotives and cars were placed in service, face-preparation equipment and methods were improved, and many other measures leading to higher efficiency and greater safety were adopted. Activity in the development of new properties was marked, with most of them designed for mechanical production, using either loading machines or conveyors.

Improvements in transportation and roof support in 1941 included wider use of rail welding by the steel, bronze or Thermit processes and extended use of treated ties, including the Koppers "Ar-moored" steel tie on a treated-wood base pioneered for room-entry service by the Hanna Coal Co. some years ago. With steel on the critical list, coal-mining companies

With installation of 367 mobile loaders, 1,800 conveyors and over 200 shuttle cars setting the pace, improvements at bituminous mines touched all phases of operation in 1941. Summarizing this work, including mining methods, ventilation, pumping and drainage, transportation and safety, this article also presents a number of suggestions for increasing production and efficiency to better meet war-time demands.

also turned their eyes more to the use of treated timber, concrete and "Gun-ite." Eastern Ohio was one of the fields showing an increased use of the latter in 1941.

The steel question also was responsible for greater interest in wood, fiber, asbestos-cement and similar

materials for mine piping in 1941, along with an extension of ditching and the drilling of horizontal holes in barrier and other coal pillars as short cuts for drainage. More companies developed large storage sumps. Installation of improved pumping equipment was marked by a wider adoption of corrosion-resisting materials and a growing use of deepwell turbine units in the mine close to the water source rather than in the usual service on the surface.

Numerous new fans, mostly of the propeller type, were installed in 1941 for increased air and power savings. Among the installations departing in some measure from the conventional was one at No. 9 mine, Jamison Coal & Coke Co., in northern West Virginia (Ladel unit), where, because of a bad curtain wall, the entire shaft was housed over the top, with the cage rope working through a gland. In the same field, the Pursglove Coal Mining Co. got ready to install a larger Jeffrey Aerodyne unit at one property at

the end of the year, with duplicate motors, transformers and controls. The two motors are mounted on opposite ends of a tilting motor base with a centrifugal coupling in the middle, thus providing automatic belt tensioning. When one motor goes off for any reason, the automatic controls switch on the other, which picks up the load through the centrifugal coupling. Automatic controls and duplicate facilities, including transformers, insure continuity of service at all times.

New fans, however, were not the only means adopted for improving ventilation. Greater interest was manifested in regular airway cleaning, and in some sections of the country, where the immediate roof is inferior, several companies adopted the practice of taking it down entirely to the solid, thus insuring absence of falls and providing additional area. The tendency also was toward more airways and the use of brattice lines and other means to insure ample air at the working faces. Several operations also converted haulage from return to intake by installation of airlocks, usually employing Canton automatic doors.

Sprinkling More Active

Considerable activity was manifested in sprinkling at the face and elsewhere underground, with a number of mining companies trying out such wetting agents as Johnson-March "Compound M," Midland "Sealtite," "Aerosol," etc., to increase effectiveness and reduce water consumption, particularly at conveyor and elevator discharges and similar locations. A few large-scale installations were reported contemplated or in progress at the end of the year. Rock-dusting was marked by a wide increase in use, characterized by the installation of a growing number of portable or semi-portable machines for trackless sections. Electric cap lamps showed another major gain, along with other protective and safety items, including self-rescuers.

Developments in rolling stock and other transportation equipment were paced by a substantial increase in the use of new and larger cars—many, although not all, in connection with mechanical loading or conveyor operation. Anti-friction bearings were the rule, with a number of companies making use of new high-strength lightweight steels, frequently with improved corrosion-resisting characteristics. Automatic couplings of the Ohio Brass and Willison types found a much wider acceptance.

Paralleling increased installations

of new cars was an increase in dumping installations, although not all, of course, were for new equipment. The Pittsburgh Coal Co., as an example, in addition to new cars and caging and hoisting arrangements and auxiliary activities at other properties, installed new Link-Belt dumping equipment at Banning No. 2, and new RandS revolving equipment in connection with tippie revisions at Montour No. 4. The Windsor Power House Coal Co., in the northern West Virginia Panhandle, also put in new Link-Belt feeding and dumping equipment, and the same company's equipment was chosen for new installations at Nemacolin (Pa.) operation, Buckeye Coal Co.

Belt Slopes Popular

Where conditions were suitable, meaning usually a shallow enough cover, new mines opened in 1941 were served by belt slopes. In many cases, these were driven by loading machines or conveyors. Contrariwise, retarding equipment was found necessary by several operations with drift openings on mountainsides. Thus, Kanawha installations in 1941 included a 500-ft. rope-and-button conveyor for the Ames Mining Co., Elmo, W. Va.; headhouse equipment with rotary dump, feeder and 800-ft. rope-and-button conveyor for the Norfolk & Chesapeake Coal Co., Logan, W. Va.; and a rotary dump, combination apron feeder and bin-filling boom, reciprocating feeder and downhill conveyor for the Avis-Eagle Coal Co., Lyburn, W. Va. In connection with a new plant for the Red Jacket Coal Corporation, in Wyoming County, West Virginia, Fairmont Machinery contracted to install a 500-ft.-long rope-and-button conveyor and a 180-ft.-long belt conveyor with separate rock bin. The Fork Mountain Coal Co., Fork Mountain, Tenn., put in a Link-Belt retarding conveyor. Interest in larger storage bins between mine and preparation plant increased.

Face-preparation developments in 1941 included the wider installation of mounted equipment, greater use of hydraulic controls, and more employment of crawler or rubber-tired cutting machines, particularly in shuttle-car work, paralleled by a wider use of crawler and rubber-tired trucks for moving shortwalls in shuttle-car or conveyor operations. The growth of trackless mining also was reflected in greater use of rubber-tired drilling machines, such as the Sullivan, and crawler units, such as the new Chicago Pneumatic machine brought out last year.

Increased interest in shearing also was in part responsible for the growth in mounted equipment of the universal type. In shortwall mines, in addition to replacements with new higher-capacity units, there was much activity in lengthening cutter bars and increasing feed speeds, where possible, for higher performance. The use of patent multiple-pointed throwaway bits increased, along with tipping with hard-surfacing materials. Conveyor-type coal augers made another gain, with increased stress on the use of throwaway-type auger bits.

Permissible explosives and blasting devices again advanced at the expense of black powder. Cardox use was extended in many mines already employing it, and was adopted by a number of new operations. Airdox also found increasing use in States forbidding shooting on the shift, with central compressor stations and tubing lines, as at the Ingle Coal Co. and Princeton Mining Co., in Indiana, finding increasing favor.

Loader Sales at New High

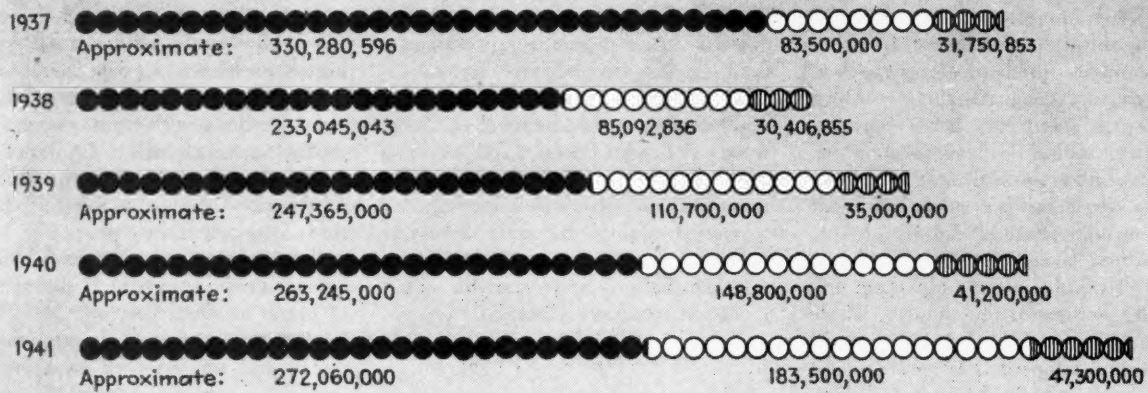
Sales of mobile loading machines to the bituminous industry reached a new high of 367 in 1941, with one additional machine going to an anthracite operation. Sales to bituminous mines in 1940 totaled 233. Machines in actual use in 1939 totaled 1,573 (see article starting on p. 66). Reflecting the faster pace of mechanical mining in the East and South in recent years, by far the largest proportion of the total sales in 1941 were to Alabama, eastern Kentucky, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia, with the latter State leading the list and followed by Pennsylvania. Illinois and Indiana also added substantially to the total of mobile loaders in service, in addition to some replacement of older equipment. Colorado, New Mexico, Utah and Wyoming also took additional equipment.

Sales in 1941 showed a distinct trend to high-capacity equipment for use in thinner seams, such as the Joy 14-BU, Goodman 360 and 460, and the Jeffrey L-500. Sales of high-type equipment naturally continued, but apparently in lesser volume.

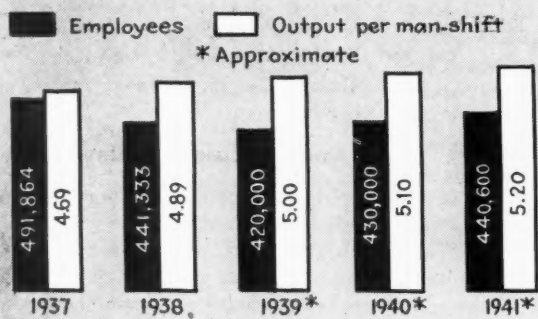
Sales of conveyors to bituminous mines also registered a new high of 1,800 units in 1941, compared with 1,573 units in 1940. The number in actual service in 1939 was 2,393. The figures include a certain number of main-line and similar units, as well as a large number of shaker units with and without self-loading heads, or duckbills. Duckbills showed a sub-

BITUMINOUS OPERATING STATISTICS

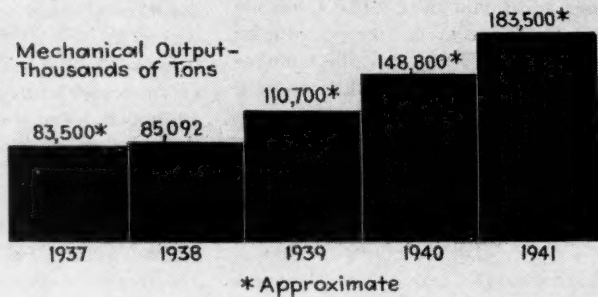
Strip
 Mechanically loaded
 Produced by other methods



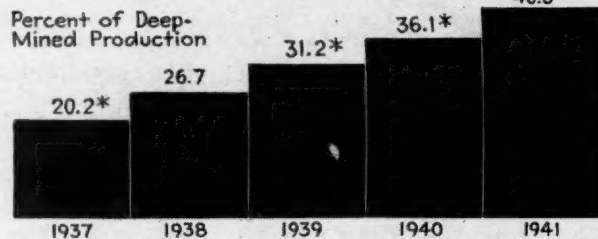
Mechanical mining and stripping show steady gains in late years.



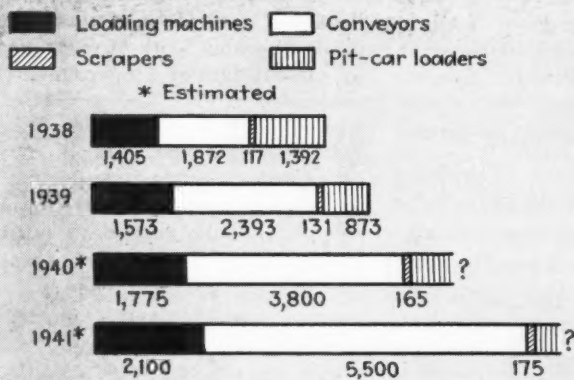
Output per man-shift climbs steadily.



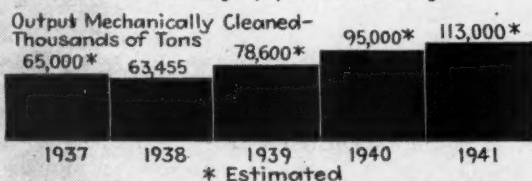
* Approximate



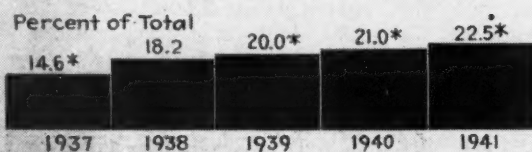
Approximately 40 percent of the deep-mined tonnage is produced mechanically in 1941.



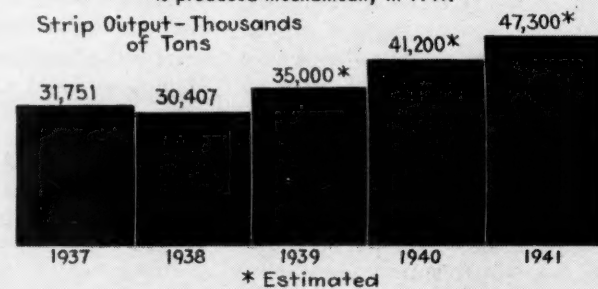
Mechanical-mining equipment continues gains.



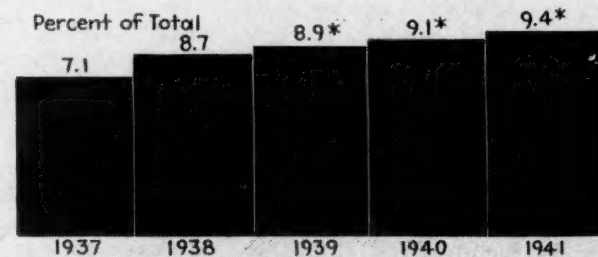
* Estimated



Mechanical cleaning maintains upward trend.



* Estimated



Stripping growth continues in 1941.

stantial gain in 1941 in thinner seams, especially where difficult roof conditions prevail.

Major gains also were registered in the installation of hand-loaded conveyors, especially in the thinner seams, although even here low-type loading machines and rubber-tired haulage offered a growing challenge. By far the largest proportion of the conveyor sales were made in the East and South, although relatively substantial numbers went into operations in the Southwest and Far West, particularly the latter. Use of belt-type gathering conveyors increased materially, with still more mines adopting belts for the entire transportation job.

The growth in mechanical mining also put its stamp on auxiliaries ranging from bigger cars to better shop facilities. As examples of the latter, the Consolidation Coal Co. built a new underground shop for loaders, cutters and locomotives at its No. 93 operation, Jordan, W. Va. (to be described in a future issue), and the Pursglove Coal Mining Co., Pursglove, W. Va., erected a new surface shop, including the necessary cranes, metallizing equipment and a second floor for certain work and armature storage, connected with the main floor by an elevator.

Among the many installations of larger mine-car equipment were new 354-cu.ft. Differential "Axless" cars with "Naco" cast-steel Timken-bearing wheels and Willison automatic couplers to serve Jeffrey L-400 loading machines at the Arkwright Coal Co., Morgantown, W. Va. Made of "Cor-Ten" steel and weighing 6,800 lb., these cars have a mechanically loaded capacity of 10 tons. The Nemacolin (Pa.) mine, Buckeye Coal Co., was put on a 100-percent mechanical basis in 1941, using Goodman and Jeffrey loaders, with orders placed for a complete complement of new high-capacity 8-wheeled Bethlehem cars.

Conveyor operations also went in some numbers to larger cars for higher efficiency and lower maintenance. The Adams Fuel Corporation, South Fork, Pa., for instance, ordered new 3½-ton A.C.F. car equipment in 1941 to supplement complete mechanization with Jeffrey room conveyors and mother belts.

Big cars and transfer stations behind loading machines, where other conditions, such as small shafts, prevent taking large cars to the surface, made a substantial gain in 1941. Use of such equipment (including Sanford-Day drop-bottom cars) was pioneered by the Wasson Coal Co., Har-

risburg, Ill., in 1937, and installations since that time include the Princeton Mining Co. (*Coal Age*, May, 1941, p. 47), Templeton Coal Co. (to be described in an early issue), Perry Coal Co., Rochester & Pittsburgh Coal Co., Pittsburgh Coal Co., etc. New installations on the way at the end of the year included the Powhatan Mining Co. and the Hocking Valley Mining Co., in Ohio.

Shuttle-car service experienced a boom in 1941 with shipments of over 200 units to bituminous mines, compared with some 155 in 1940 and approximately 70 in 1939. About one-third or more, available evidence indicates, were for coal less than 4 or 4½ ft., with several installations for coal as thin as 36 in. Shipments and installations by States were: Alabama, 9; Colorado, 6; Illinois, 25; Indiana, 13; Kentucky, 44 (mostly in the eastern part of the State); Ohio, 7; Pennsylvania, 42; Tennessee, 4; Virginia, 4; West Virginia, 50.

Among the Lee-Norse "Koal-Mobile" installations were four at the Edgewater Works and five at the Hamilton Works of the Tennessee Coal, Iron & Railroad Co., in Alabama. The Consolidated Coal Co., in Illinois, added substantially to "Koal-Mobile" equipment at its Nos. 7 and 15 mines. Other installations were made in Penn-

sylvania, Ohio and western Kentucky, where the West Kentucky Coal Co. installed two units at its new North Diamond mine, in addition to Joy shuttle cars for this and other properties. The Peabody Coal Co. and subsidiaries added substantially to Joy units in service in Illinois, eastern Kentucky and southern West Virginia. Koppers was another organization extending use of Joy equipment in West Virginia, along with the Consolidation Coal Co. and others. A substantial proportion of the Joy shuttle cars installed in Pennsylvania, as well as in West Virginia, eastern Kentucky and other States, were in thin coal.

A major development in shuttle-car work in 1941 was the use of belt conveyors with such cars, which practice was pioneered by the Wheeling Township Coal Mining Co., Adena, Ohio, using a cable-reel "Koal-Mobile" and a Joy mother conveyor with a special Goodyear belt driven at 420 f.p.m. by a 40-hp. Reliance motor. Additional equipment has since been added to permit room panels to be mined with two shuttle units working to a mother belt, which discharges into mine cars on the main entry. Interest in the possibilities of the belt-and-shuttle-car system resulted in decisions to adopt this practice at several other properties.

War-Output Planning

How to mine more coal already is a major problem which may be expected to become more pressing as armament progresses. Mining it more efficiently, a major goal in peace time, also takes on added importance. Mechanical operation, of course, is one of the best ways of increasing both output and efficiency, as well as helping compensate for a growing labor shortage. But the opportunities for increasing output and efficiency are by no means limited to the use of mechanical loading and conveying equipment. Overhauling, tightening up and smoothing out all other operations connected with underground production, transportation, ventilation, drainage, safety, etc., can help materially in achieving the desired goal.

While it is true that obtaining maximum results may require substantial investments in new equipment, which now is more difficult to get, the coal industry should be prepared to make such investments where possible.

The resultant benefits also should go far in lightening the strain of post-war adjustments. But increasing efficiency need not involve substantial sums of money in all cases. Consequently, the suggestions given below include both those involving purchase of new equipment and those which may be adopted with little or no expenditure. Others, of course, will suggest themselves to executives and operating men. Electrical, maintenance and supplies considerations are analyzed elsewhere in this issue.

Mechanical Equipment— Mining Methods

Installation at the fastest possible rate of mobile loading equipment or self-loading conveyors where height, roof, etc., permit, keeping in mind that mobile machines are being more and more adapted to thin coal.

Installation at the fastest possible rate of conveyors—hand- or self-load-

ing types, depending upon conditions—in the thinner seams and other locations where mobile loaders and similar equipment cannot be used.

Adoption of scraper-type and other equipment for special conditions.

Use of transitional equipment, such as pit-car loaders, which provide some increase in efficiency, if obtaining other equipment should be too difficult.

Mechanization of rock work, tunnel driving, slope sinking and similar operations with mobile rock loaders, scraper or slusher units, conveyors, etc.

Changes in mining methods to:
(1) increase recovery per acre;

(2) widen working places or permit the use of long faces—particularly important with mechanical-mining equipment; (3) increase concentration and provide working territories more nearly suitable in size to the production or equipment units in service; (4) put the workings on an angle for more efficient equipment movement, haulage, etc.; (5) reduce the open territory which must be ventilated, inspected and protected; (6) shorten haulage, ventilation and water travel; (7) provide more airway area; (8) obtain the numerous advantages of full-retreat work; (9) cut haulage grades, etc.

Comprehensive forecasting of operations for better control of expenditures and most efficient use of equipment, as well as maximum efficiency in meeting possible demands.

Face Preparation

Installation of new high-capacity mounted cutters, which also, in the universal types, provide the advantages of shearing, or new high-capacity shortwall equipment, with hydraulic controls where possible.

Reconstruction of present equipment to increase feed speed and length of cutter bar. The latter is especially important in mechanical mining, as number of tons per fall is directly reflected in efficiency.

Utilization to the fullest of the advantages of modern facilities for trackless mining, including crawler and rubber-tired mountings and crawler and rubber-tired trucks.

More study of the possibilities of overcutting, cutting out refuse bands, cutting in rash or drawslate over the coal, etc.

Shearing to increase lump, reduce explosive consumption and make loading easier.

Use of special low-horsepower cutting equipment for certain jobs, such as conveyor mining.

Adoption of patent multiple-pointed cutter bits or hard-surfacing to save labor, cut power and maintenance, and increase capacity.

Mechanization of drilling if not already so.

Greater utilization of newer high-capacity power drills and auxiliaries, including crawler or rubber-tired equipment for trackless mining.

More study of the coal-breaking medium to see if new permissibles, carbon dioxide, air, etc., will cut cost, increase lump and improve loadability.

More attention to such items as drilling patterns and width of place to insure better breaking with greater safety and a lower explosive consumption.

More attention to stemming practices, adoption of machines for filling dummies, use of patented stemming mediums, cleaning kerfs, shotfiring methods and equipment and other auxiliary items.

Mechanical Mining Practices

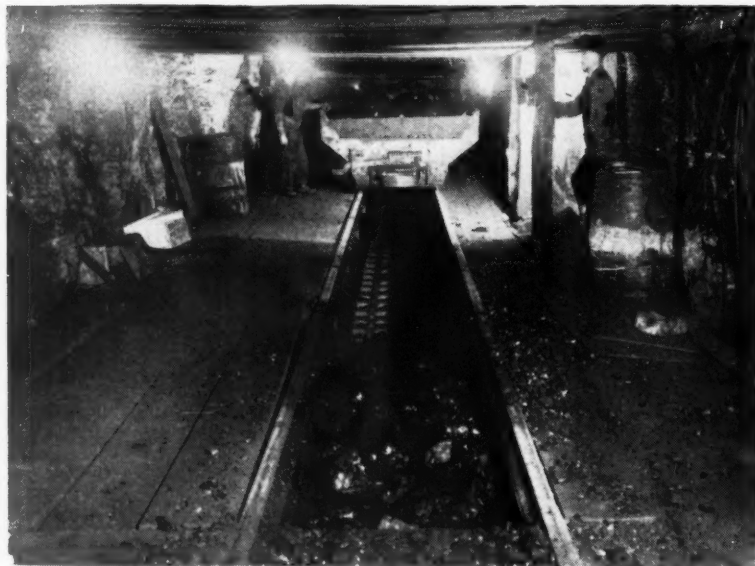
Increased multiple shifting.

Best possible balance in capacities of equipment making up the mechanical-mining unit.

Best possible balance and adjust-



This Wheeling Township Coal Mining Co. belt unit takes coal from shuttle cars—an outstanding 1941 development.



Bigger mine cars were among the methods used to improve efficiency in 1941. The equipment shown here, in operation at the Peerless mine, in Indiana, is supplemented by a transfer station.

ment of the various steps in the working cycle, thus insuring that the main mechanical-mining units will not be handicapped by delays in or failure to properly perform cutting, drilling, bugdusting, shooting, tracklaying, timbering, car service, etc.

Adequate time-study and report systems to reveal delays and opportunities for improvements. These should cover transportation service and mechanical and electrical delays on all equipment units, as well as other pertinent activities.

Ample number of working places per unit in both entry driving and room work.

Adequate manpower for all activities so that failure to do something or to do it right, such as bugdusting, will not result in machine delays.

Good supervision.

Widest possible places and deepest possible cuts to reduce non-productive and moving time to a minimum.

Systematic timbering, with especial attention to safety posts and bars in the working zone.

With conveyor systems, best possible transportation through such steps as big cars, adequate sidetracks and the use of mother conveyors, preferably long belt units, with car-spotting hoists or locomotives.

With mobile loaders, best possible transportation through: (1) keeping car-changing distances short (not over 150 ft. if possible); (2) using the proper track layouts and two changing locomotives if the mining system permits; (3) biggest possible mine-car equipment, either by purchase of new cars or rebuilding old to increase capacity; (4) use of big cars and transfer stations in the working sections where shaft size or other considerations make it necessary to use small cars for the trip to the outside; (5) use of room conveyors—preferably with mother belts; (6) use of shuttle cars—at least two per loading machine—with elevating conveyors or other transfer unit; (7) use of shuttle cars with mother belts—a new development of 1941. The best possible transportation system is well worth its cost in mobile loader, as well as conveyor work.

Transportation

Shortest possible haulage routes. The cost of new short routes, inside or outside, usually is a Grade A investment.

Grade elimination. This also is a Grade A investment.

Best possible track construction

standards. This will include in room-entry and room service use of 40-lb. rail. Steel or combination steel-and-wood ties, with steel-tie switches, usually will be found a paying investment in such service because of ease of installation and removal. On main lines, good construction will include 60-lb. or heavier rail (welding of joints has become increasingly popular in late years), treated ties, good subgrade and ballast, super-elevation where necessary, good drainage and adequate roof support—treated timber, hitch-drilling for bars, Gunite, concrete, steel bars or other supports if obtainable, etc.

Rolling stock suited to the job, including new locomotives or reconstruction of the old, if necessary, and modern high-capacity mine cars with such features as high-strength corrosion-resisting steel, anti-friction bearings, automatic couplers, etc.

Use of battery locomotives for such services as car-changing.

Proper haulage controls, including dispatching with telephone or "radio" system, block signals, electric switch-throwers, etc., as necessary.

Study of the possibilities of main-line conveyor transportation.

Use of belt slopes for new mines where cover permits and study of the possibilities of replacing present shaft hoists with belt slopes. Several properties have found the latter a paying investment.

Installation of storage bins to take up the slack between the mine transportation system and the preparation plant.

Use of modern car feeders, automatic cagers and trip-makers to speed hoisting.

Use of overturning cages to permit employment of larger solid cars.

Use of skips to raise shaft capacity and permit using larger cars underground.

Ventilation

New fans to provide more air with less power.

Better provisions for insuring that the air reaches the face, including more airways, better cleaning, improved stoppings, increased use of overcasts to eliminate doors, and positive means, such as brattice lines, of conducting the air from room heading to face.

Greater utilization of the principle of one-way air circulation by construction of auxiliary shafts or openings, thus saving power and improving ventilation.

More sealing to reduce the ventilating load.

Improved protection of airways by better timbering, Guniting, painting, air conditioning, etc.

More use of air locks to improve ventilation or to convert haulage openings from returns to intakes.

More attention to equipping ventilating units with standby power sources, as well as signals showing whether they are in operation.

Pumping and Drainage

More attention to collecting water in one spot by altering direction of driving, ditching, etc., thus saving pipe and increasing efficiency by limiting pumping to fewer units with larger capacities.

Increased use of ditches to the outside, boreholes (horizontal or inclined as well as vertical), siphons, rock tunnels and similar measures for shortening pumping distances and letting gravity do as much work as possible.

Sealing, dams, emergency doors, etc., for controlling water flow and keeping it out of active workings.

Greater use of automatic or semi-automatic pump controls.

Greater use of corrosion- and wear-resisting materials in pumps.

Greater use of wood, fiber, asbestos-cement, tile and similar pipelines to save steel and resist corrosion.

Safety

Establishment of a safety organization, including employment of a safety director.

Inclusion of employees in the safety organization.

Enlistment of supervisory cooperation.

Training in first-aid and mine-rescue.

Systematic timbering and use of safety posts and bars.

Proper electrical and mechanical safeguards.

Better ventilation and the increased use of permissible electrical equipment, miners' lights, explosives and blasting devices, etc.

More rock-dusting, sprinkling and provisions for fire fighting.

Development of a code of safe working practices.

Training of supervisors and employees in safe working practices.

Use by all men of all protective-equipment items, such as hard hats, safety shoes, goggles, self-rescuers, etc.

Ample supply of rescue equipment and first-aid materials.

MECHANICAL MINING

And Cleaning Capacity Rise in 1941; Loader and Conveyor Sales Hit New High

TOTAL production of mechanically cleaned bituminous coal in 1939, the latest year for which data are available, was 72,576,085 net tons at the mines and 6,800,587 tons at central washeries, a total of 79,376,672 tons. Production of mechanically loaded coal in 1939 was 110,711,970 tons at underground bituminous mines and 11,773,833 tons at underground anthracite mines, or a total of 122,485,803 net tons. The estimated capacity of mechanical loading equipment introduced in bituminous coal mines was 30.8 percent greater in 1941 than in 1940. The total number of units sold to bituminous mines increased from 1,845 in 1940 to 2,185 in 1941, and the grand total for bituminous and anthracite increased during the same period from 2,037 to 2,519, or 23.7 percent. Sales to lignite mines are included under the bituminous classification for purposes of this survey.

Source of Information—All 1939 data on bituminous coal production and mechanical loading equipment in use were compiled by the Bureau of the Census, U. S. Department of Commerce, in cooperation with the Bituminous Coal Division, U. S. Department of the Interior. The data on mechanical cleaning of bituminous coal are compiled from reports courteously furnished by manufacturers of mechanical cleaning equipment for use at bituminous coal mines, supplemented with data from various trade journals. The figures on mechanical loading are based upon reports courteously supplied by all known

By W. H. YOUNG,
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G. A. LAMB
and F. M. SHORE*

manufacturers of mechanical loading machinery for underground use in coal mines. The number of manufacturers reporting in 1940 was 32.

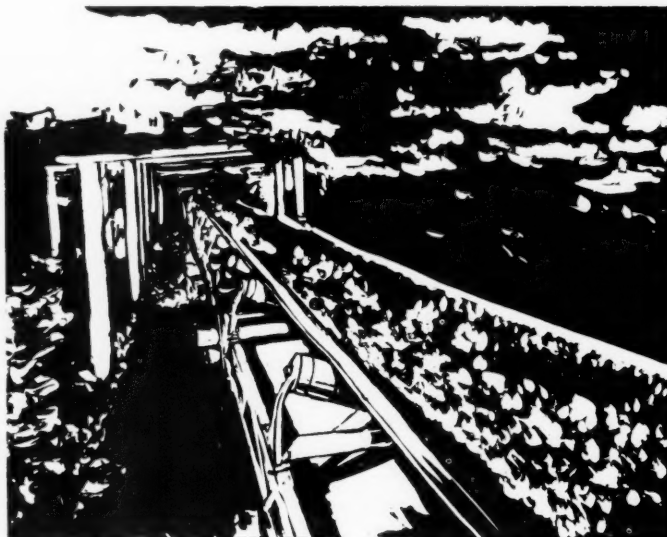
Installations of mechanical cleaning equipment at bituminous mines were made in 11 States during 1941, according to the reports on sales. Although these sales were made during 1941, several of the plants will not be completed until early in 1942. The total capacity of cleaning plants sold in 1941 is estimated at 8,000 net tons of cleaned coal per hour, as compared with 12,000 tons capacity sold in 1940. Installations at mines not previously having cleaning plants accounted for one-half the total capacity, and addi-

tional equipment at mines with previous cleaning equipment accounted for the other one-half. About 90 percent of the total capacity of the 1941 sales was reported for wet-washing plants, and the other 10 percent for pneumatic cleaning plants. The largest number of installations was reported by West Virginia, with Pennsylvania, Alabama, Kentucky and Illinois following in the order named. In terms of capacity, West Virginia was the greatest, with Pennsylvania, Kentucky, Illinois and Indiana following.

Mechanical Loading: Total Units Sold by Type—The number of mobile loaders sold during 1941 amounted to 368, as compared with 233 in 1940, an increase of 57.9 percent. This is the highest number of annual sales ever recorded. The former peak year of sales for mobile loaders was 1936, when 344 sales were made.

Sales of scrapers decreased from 39 in 1940 to 11 in 1941, or 71.8 percent.

Sales of conveyors registered an all-time high in 1941, with a record of



*Messrs. Young, Anderson and Lamb are members of the Economics Branch, Bituminous Coal Division, U. S. Department of the Interior. Mr. Shore is chief, Coal Economics Division, U. S. Bureau of Mines.

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Table I—Units of Mechanized Loading Equipment Sold to Bituminous and Anthracite Mines, as Reported by Manufacturers, 1934 to 1941, Inclusive¹

	1934	1935	1936	1937	1938	1939	1940	1941	Percent Increase (+) or Decrease (−) 1941 from 1940
Mobile loaders.	55	115	344	292	241	292	233	368	+57.9
Scrapers ² .	34	22	28	29	10	26	39	11	−71.8
Conveyors ³ .	610	681	994	1,095	990	1,311	1,762	2,130	+20.9
Pit-car loaders.	26	28	11	32	139	2	3	10	+233.3

¹Data for 1934 to 1936 include reports from 28 manufacturers; 1938, 1939, 1940 and 1941 data include 29, 31, 32 and 32 manufacturers, respectively.

²Reported as scrapers or scraper haulers and hoists.

³Includes hand-loaded conveyors and those equipped with duckbills and other self-loading heads. As sales of both loading heads and shaker conveyors are counted, the figures involve a certain measure of overlap, which cannot be determined accurately. It should also be noted that a small number of conveyors were for use in conjunction with mobile loading machines.

2,130 sales, an increase of 20.9 percent over 1940. The conveyor unit sales figures include both hand-loaded types and those equipped with duckbills or other self-loading heads. In counting sales of duckbills and shaker conveyors on which they are used, there is a certain overlapping of sales, the extent of which cannot be accurately determined. The number of duckbills cannot be shown separately without disclosing the figures of individual companies.

Sales of pit-car loaders increased from 3 in 1940 to 10 in 1941. Table I shows the number of units of mechanized loading equipment sold to bituminous and anthracite mines as reported by manufacturers for the years 1934 to 1941, inclusive, with percent of increase or decrease in 1941 over 1940.

Total Sales by States—Shipments of mechanical loading devices were made to 20 States in 1941. Table II shows the total number of units placed in each State or region. In a few instances, separate figures are not shown for each State to avoid disclosing the business of individual manufacturers. Types of equipment in approximate order of capacity are shown by letter symbols. For example, in West Virginia 833 units of loading equipment were sold. In this aggregate of new equipment sold, conveyors (indicated by "C") furnished the largest addition to capacity, followed by mobile loading machines ("L"), pit-car loaders ("P"), and scrapers ("S"). A total of 2,185 units of all types were shipped to bituminous mines and 334 to anthracite mines in 1941.

Types of Machines Sold Compared With Units in Use in Bituminous Mines—Table III shows the change in demand since 1931 for the different types of mechanical loading devices. Mobile loaders in active use, as reported by mine operators, increased from 583 in 1931 to 1,573 in 1939. Sales of mobile loading units in 1940

and 1941 were 233 and 367, respectively. The total sales in these two years amounted to 38.1 percent of the number in active use in 1939.

Scrapers in use decreased from 146 in 1931 to 131 in 1939, or 10.3 percent. Total sales in 1940 and 1941 were 36 and 8 respectively, or 33.6 percent of the total number in use in 1939. Pit-car loaders decreased from 3,428 in 1931 to 873 in 1939, or 74.5 percent. Sales of pit-car loaders in 1941 continued at a low rate, with ten sales reported for the entire bituminous industry.

The first year for which data on both self-loading and hand-loading conveyors are available is 1933, when 657 machines were in use. In 1939 this had increased to 2,393. Sales in 1940 and 1941 were 1,573 and 1,800, or 41.0 percent greater than the total number in use in 1939.

Types of Machines Sold Compared With Units in Use in Anthracite Mines—The change in demand for different types of mechanical loading equipment for use in anthracite mines also is shown in Table III. The total number of units of mechanized loading equipment in use at anthracite mines increased from 1,038 in 1931 to 2,532 in 1939. Detailed figures are shown for the years 1931 to 1935, inclusive, but certain items have had to be combined in other years to avoid disclosing individual operations. The total sales in 1940 and 1941 were 192 and 334, respectively, or 20.8 percent of the number in use in 1939.

Types of Equipment Purchased by Regions in 1941—Table IV shows the number of mobile loaders, scrapers,

Table II—Total Number of Units of Mechanized Loading Equipment Shipped for Use in Each State or Region in 1941

(L—Mobile loading machines; P—Pit-car loaders; S—Scrapers; C—Conveyors and duckbills)

	Number of Units of all Types Shipped in 1941	Types of Equipment in Approximate Order of Capacity in 1941
Northern Appalachian States:		
Pennsylvania.....	321	L.C.S.
Ohio.....	176	L.C.
Maryland.....	16	C.
Southern Appalachian States:		
West Virginia.....	833	C.L.P.S.
Virginia.....	71	C.L.
Kentucky.....	249	C.L.
Alabama.....	164	C.L.
Tennessee and North Carolina.....	51	C.L.
Middle Western States:		
Illinois.....	164	L.C.
Indiana.....	10	L.C.
Trans-Mississippi States:		
Arkansas, Oklahoma and Iowa.....	25	C.L.
Colorado.....	38	C.L.
New Mexico, Utah, Montana and Washington.....	29	C.L.
Wyoming.....	38	C.L.
Total bituminous.....	2,185	C.L.P.S.
Pennsylvania anthracite.....	334	C.L.S.
Grand total.....	2,519	C.L.P.S.

Table III—Sales of Mechanized Loading Equipment in 1940 and 1941 Compared With Total Number of Machines in Active Use in Preceding Years

	Number of Machines in Active Use, as Reported by Mine Operators ¹									Number of Machines Sold, as Reported by Manufacturers	
	1931	1932	1933	1934	1935	1936	1938	1939	1940	1941	
Bituminous mines:											
Mobile loading machines.....	583	548	523	534	657	980	1,405	1,573	233	367	
Scrapers.....	146	128	93	119	78	106	117	131	36	8	
Pit-car loaders.....	3,428	3,112	2,453	2,288	2,098	1,851	1,392	873	3	10	
Conveyors equipped with duckbills and other self-loading heads.....	165	159	132	157	179	234	346	559			
Hand-loaded conveyors—number of units..... ²	.....²	.....²	525	574	670	936	1,526	1,834	1,573 ³	1,800 ⁴	
Anthracite mines (Pennsylvania):											
Mobile loading machines.....	5	11	18	14	11	504	545	535	3	3	
Scrapers.....	457	479	455	517	507						
Pit-car loaders.....	28	24	19	25	22						
Conveyors equipped with duckbills and other self-loading heads.....	1	17	12	13	30	1,790		1,997 ⁴			
Hand-loaded conveyors—number of units.....	547	818	940	1,338	1,563		1,831 ⁴		189 ³	331 ⁴	

¹Data for 1937 not available for bituminous mines. Minerals Yearbook 1939, p. 857, shows 539 scrapers and 1,855 conveyors and pit-car loaders including a few mobile loaders in the anthracite mines for 1937.

²Number of units not reported in these years.

³Reported as face conveyors (hand-loaded), "shaker drives" and "duckbills." The figures of numbers sold in 1940 and 1941 are not exactly comparable with the number in use in 1939, because of uncertainties in defining what constitutes a conveyor and because of certain overlaps in the reporting of duckbill loading heads and shaker conveyors.

⁴Mobile loading machines included with conveyors and pit-car loaders.

and conveyor units shipped into various States and groups of States in 1940 and 1941, and the number of units in actual use in 1939. All except one of the 367 mobile loaders sold in 1941 were for use in bituminous mines. The largest number of these went to West Virginia, with Pennsylvania, Illinois, Kentucky, and Ohio following in the order named.

There were only eleven scraper units sold in 1941, eight of which went to bituminous mines and three to anthracite mines.

The southern Appalachian fields continued to be the largest market for conveyor units. In 1941, sales to the southern Appalachian States of conveyors of all types including those equipped with duckbills amounted to 1,181, compared with 981 in 1940, an increase of 20.4 percent.

Sales of all types of conveyors in the northern Appalachian States fell from 407 in 1940 to 398 in 1941, a decrease of 2.2 percent. The Trans-Mississippi States showed a decrease from 138 in 1940 to 120 in 1941. The Middle Western States showed an increase from 47 in 1940 to 101 in the year 1941.

Number of Bituminous Coal Companies Purchasing Loading Equipment in 1940 and 1941 — Table V shows that mechanization continued to spread to new fields and new companies in 1941. The number of bituminous coal mining companies using mobile loaders in 1939 and purchasers of this equipment in 1940 and 1941, by States, also are shown.

231 Used Mobile Loaders

There were 231 companies using mobile loaders in 1939. Of the 83 companies buying mobile loaders in 1940, 56 had used them before, while 27 companies were installing them for the first time. In 1941, 22 new companies began using mobile loaders, and 99 bought additional equipment. The greatest number of companies purchasing mobile loaders for the first time in 1941 were located in West Virginia.

Data on sales of conveyor equipment are not sufficiently detailed to allow a separation between "former users" and "new users."

Trackless Gathering Equipment—There were 204 installations of self-powered rubber-tired trackless haulage units made in 1941, distributed over 10 States. West Virginia received the largest number, with Kentucky, Pennsylvania, Illinois, and Indiana following in the order named.

Table IV—Comparison of Mobile Loaders, Scrapers and Conveyors in Actual Use in 1939 With Sales Reported in 1940 and 1941, by Regions

	Mobile Loaders			Scrapers			Conveyors ¹		
	In use in 1939	Sales in 1940	Sales in 1941	In use in 1939	Sales in 1940	Sales in 1941	In use in 1939	Sales in 1940	Sales in 1941
BITUMINOUS									
Northern Appalachian States:									
Pennsylvania.....	213	94	80	30	7	4	526	225	237
Maryland.....	..	..	..	..	..	..	48	..	16
Ohio.....	91	23	31	..	1	..	50	178	145
Michigan.....	..	..	..	..	..	..	1	4	..
Southern Appalachian States:									
Alabama.....	16	6	22	45	10	..	193	54	142
Kentucky.....	68	18	37	3	..	..	161	134	212
Tennessee.....	8	..	2	..	..	..	62	26	49 ⁴
West Virginia.....	331	59	107	7	18	4	586	724	712
Virginia.....	31	4	5	..	..	..	39	43	66
Middle Western States:									
Illinois.....	540	8	65	..	..	..	29	25	99
Indiana.....	138	7	8	..	..	..	26	22	2
Trans-Mississippi States: ²	137	14	10	46	..	..	672	138	120
Total bituminous.....	1,573	233	367	131	36	8	2,393	1,573	1,800
ANTHRACITE									
Pennsylvania..... ³	..	..	1	535	3	3	1,997 ³	189	330
Grand total.....	1,573	233	368	666	39	11	4,390	1,762	2,130

¹Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads.

²Includes Arkansas, Colorado, Iowa, Kansas, Montana, New Mexico, North Dakota, Oklahoma, Utah, Washington and Wyoming.

³Mobile loaders and pit-car loaders included with conveyors.

⁴Includes North Carolina.

Table 5—Number of Bituminous Coal Mining Companies Using Mobile Loaders in 1939 and Number of Companies Purchasing Equipment in 1940 and 1941

(Based upon records covering 84 percent of the total sales in 1940 and 89 percent in 1941)

	Users in 1939	Purchasers in 1940		Purchasers in 1941	
		Former Users	New Users	Former Users	New Users
Northern Appalachian States:					
Pennsylvania.....	28	16	6	21	3
Maryland.....	..	..	..	..	..
Ohio.....	14	2	4	8	1
Southern Appalachian States:					
West Virginia.....	61	15	9	31	7
Virginia.....	12	2	..	3	..
Kentucky.....	24	5	3	11	6
Tennessee.....	3	..	..	1	..
Alabama.....	6	1	2	7	1
Middle Western States:					
Illinois.....	38	4	..	8	3
Indiana.....	20	4	..	4	..
Trans-Mississippi States:					
Arkansas.....	1	..	..	..	..
Colorado.....	7	1	1	..	1
Iowa.....	..	1	1	..	..
Montana.....	5	1	..	1	..
New Mexico.....	2	1	..	1	..
North Dakota.....	..	..	..	..	..
Oklahoma.....	..	..	..	..	..
Utah.....	7	2	..	2	..
Washington.....	..	..	..	..	..
Wyoming.....	3	2	..	1	..
Total.....	231	56	27	99	22



BITUMINOUS STRIPPERS

Install Much New Equipment And Otherwise Prepare for Future Demands

BITUMINOUS strippers found 1941 a busy year with output up, much new equipment going into service and new mines being opened, in addition to reconstruction and improvement programs designed to better facilities already in service. Organizations using small stripping and loading equipment, usually powered by internal-combustion engines, were equally active with operations using larger electrically powered units. As in other late years, the trend to automotive transportation gained momentum.

Although tonnage was up in all fields where stripping is practiced, perhaps the most noteworthy gains were in eastern Ohio, the northern West Virginia Panhandle and western Pennsylvania. In this region, where recovery of hillside outcrops with small equipment is the general practice, new operations were opened in substantial number and much new equipment was acquired to expand production from existing properties. A number of deep-mining companies adopted or expanded stripping work, either with their own equipment or by contracting, to increase recovery and expand production.

Activity was not limited entirely to small equipment, however, as the Hanna Coal Co., for example, installed a new Bucyrus-Erie 550-B electric shovel with 15-cu.yd. Man-Ten dipper at its Georgetown No. 12 property in eastern Ohio, supplementing the original 8-yd. Marion 300 unit brought in from the Iron Range. The new shovel was accompanied by a new 54-B loader with $4\frac{1}{2}$ -cu.yd. dipper, supplementing the original 3-yd. 44-B machine, new 29-T blast-hole drills and new Dart 18-cu.yd. 15-ton gas

trucks. At its Piney Fork stripping, Hanna continued its successful practice of building storage bins on the outcrop for reloading the coal into regular mine cars for transportation to the preparation plant on the off-shift (*Coal Age*, October, 1941, p. 109).

Development of stripping operations using small equipment also was active in the older fields of the Middle West and Southwest. As an example, the Pioneer Coal Co. opened a new property in Bureau County, Illinois, with a 5-W Monighan walking dragline as the stripping unit. A number of other new small dragline operations went into production in this State, as well as elsewhere in the two regions. An Arkansas property, operated by O. E. Tapley, installed a T7 "Traxcavator" loading outfit, consisting of a front-end bucket unit on a Caterpillar tractor. In operation, the equipment moves into the face, takes up a bucketful of coal and then turns to dump it into a truck.

In Kansas, the Pittsburg & Midway Coal Mining Co. completed a year of operation with a modernized layout at its No. 18 mine, recovering the 16- to 18-in. Bevier seam. Equipment includes a 25-cu.yd. 750-B stripper, 5-cu.yd. 75-B horizontal thrust loader, both rebuilt, and a new combination rail and tractor-trailer haulage set-up. The automotive units consist of Dart butane tractors pulling 40-ton United Iron Works semi-trailers, which operate between the pit and a transfer station (*Coal Age*, November, 1941, p. 52).

Other developments in the Southwest included acquisition of control of the Windsor Coal Co. by the

McAlester Fuel Co., which late in the year began moving the preparation plant and other equipment to a new territory at New Castle Station, Mo. The original 8-cu.yd. Marion and 325 Bucyrus-Erie stripping equipment will be supplemented by a new 15-cu.yd. Marion shovel with "knee-action" front.

Illinois also saw the conversion of another rail-haulage property to combination rail-and-truck operation. The property in question, Fidelity No. 11, United Electric Coal Cos., adopted tractor-trailer haulage for its No. 1 pit, the equipment consisting of Autocar tractors with 150-hp. Cummins diesel engines pulling 25-ton semi-trailers—Fruehauf running gear and Garwood side-dump bodies. No. 2 pit remains on rail haulage for the present. Fidelity No. 11 also was equipped with a new 30-cu.yd. 950-B stripping shovel, while one of the original units, a Marion 5600 electric shovel, heaviest in the industry and rebuilt a few years ago to carry a 26-cu.yd. dipper, was converted into a dragline with 200-ft. boom and 20-cu.yd. bucket.

In central and northern Illinois, the Little John Coal Co. installed a 15-W. Bucyrus-Monighan dragline; the Northern Illinois Coal Corporation was reported to have two 25-cu.yd. draglines under construction, and the Midland Electric Coal Corporation was completing erection of a new Marion 5561 stripping unit with "Amplidyne" control for power economy and simplified operation. New stripping properties were opened by the Fairview Collieries Corporation and the F. C. Morgan Coal Co., the latter installing 35-ton semi-trailers pulled by Dart tractors. Other new properties in de-

velopment included the Sunnyside mine of the Central States Collieries, Inc.

Indiana activities included bringing the new Robin Hood No. 3 mine of the Sherwood-Templeton Coal Co. into full operation. This property is equipped with a 19-cu.yd. 550-B stripper with a front end especially designed so that the boom can be lengthened in the future, a 5-cu.yd. 85-B loader and Dart 200-hp. tractors pulling United Iron Works 30-ton semi-trailers. The coal is dumped into a hopper and reloaded into railroad cars for transportation to the Friar Tuck preparation plant.

Maumee Collieries Co. completed over a year's operation at its Linton No. 23 operation with its new 15-W walking dragline with 215-ft. boom and 12-cu.yd. bucket, used to salvage a thin upper seam and also relieve the burden on the 5480 shovel uncovering the main lower seam. Maumee also opened No. 26 mine on Aug. 20, 1941, recovering 6 ft. of coal under an average of 30 ft. of burden with a Marion steam shovel rebuilt in its own shops and carrying a 10-cu.yd. dipper. Loading is done with another rebuilt Marion steamer with larger boiler and dipper. The coal is prepared in the No. 23 plant.

units, such as draglines, large scrapers, etc., to help out shovels by taking the soft stuff off the top and thus making it possible to uncover more coal in a given time or tackle areas with overburden too thick for present shovel equipment.

Installation of new light-weight higher-capacity dippers or buckets.

Increasing swing or hoist speed, counterbalancing dippers, etc.

Use of lighter lower-cost auxiliaries, such as scrapers, small shovels or draglines, etc., for doing such work as ditching, damming, cleaning up slides, etc., thus leaving regular equipment entirely free for the work for which it was installed.

Use of auxiliaries such as those noted in the preceding suggestion in stripping in the regular pits where possible or for recovery of isolated coal areas when not engaged in their regular work. Also, thought might be given to using loading equipment for auxiliary services or stripping on off shifts where conditions will permit.

Study Operating Methods

Careful study of the stripping cycle (dig, swing and dump) to save time and increase output.

Careful study and revision of overburden shooting practices (including investigation of new breaking mediums) to see if better preparation will prevent shovel delays and increase efficiency.

Careful study of pit layout to give stripping units the best possible chance, promote efficient drainage, improve haulage, etc.

Investigation of the possibilities of supplementing stripping with deep-mining to increase output where the overburden gets over the practicable digging limit.

Installation of truck or combination truck-and-rail haulage if not already the practice.

Use of larger truck haulage equipment and installation of diesel or butane engines on present equipment where conditions warrant.

Improved road construction, including, possibly, concrete for main loaded routes. Better roads now are more important than ever as a means of conserving trucks and tires, both of which are now closely restricted.

Careful check of maintenance and inspection practices to keep all equipment on the job as much of the time as possible.

Best possible power service to keep voltage up and prevent interruptions, in addition to promoting safety.

War-Planning Suggestions

BITUMINOUS stripping operations, of course, will play a major role in meeting the nation's increased coal requirements during the war effort. Ways of increasing stripping output include: (1) installation of new equipment and (2) more production from present facilities. Both should be adopted as far as developments dictate, with perhaps the major stress on more from equipment in service, as it probably will be more difficult to obtain new units, either for additions or replacement of present units, although such steps are included in the suggestions below.

On the whole, few, if any, new principles or practices need be developed to do the job, although research in

new production equipment and methods, such as along the line of stacker development, should by no means be relaxed or abandoned. More progress along well-established lines seems to be the major need of the immediate future. Some suggestions to that end (others undoubtedly will occur to stripping men) are given below:

Installation of improved higher-capacity stripping and loading equipment for more production and reduced maintenance.

Replacement of obsolete equipment if it cannot be reconstructed or converted into auxiliaries. Rebuilding for dragline service is one conversion example.

Installation of auxiliary stripping



One of the large new stripping units installed at bituminous mines in 1941—30-cu.yd. electric shovel at Fidelity No. 11

MECHANICAL CLEANING

Paces 1941 Developments In Making Bituminous Coal More Efficient

INSTALLATION of new bituminous preparation facilities continued at a high level in 1941. Numerous complete new plants were constructed, both with and without mechanical cleaning, while installation of new equipment in old plants and their reconstruction went on apace. Much of this reconstruction was devoted to new cleaners for one or more sizes, to improvements and extension of picking and screening facilities, and to breaking or crushing installations, some for reducing the top size of mine-run but the majority for producing stoker coal and other smaller grades.

Improvement of present river-loading facilities and construction of new was particularly active in 1941. In northern West Virginia, for example, a new river-and-truck plant, designed by Interstate Engineers & Constructors, Inc., was installed by the Rose-dale Coal Co., while facilities also were under construction by the Consolidation Coal Co., thus increasing still further the number of plants on the Monongahela River. In western Pennsylvania, the Duquesne Light Co. contracted for a complete Roberts & Schaefer preparation plant with river-loading facilities and Hydroseparator washers for the 5x1-in. size. In southern West Virginia, the Kanawha Mfg. Co. started alterations on the Harewood river plant of the Semet-Solvay Co.

New tipples constructed in 1941 by various manufacturers included: Kanawha—Ames Mining Co., Elmo, W. Va., five tracks; Carbon Fuel Co. (No. 5), Republic, W. Va., four tracks with 100-ton slack storage bin; Stover Smokeless Coal Co., Stonewall, W. Va., four tracks; Link-Belt—Utah Fuel Co., Sunnyside, Utah; Alpha Coal Co., Alpha, Ill.; Jeffrey

—Star Mining Co., Salem, Ohio; Roberts & Schaefer—Republic Steel Corporation, Virginia, Ala., mine-run plant with Bradford breaker; Fairmont—Red Jacket Coal Corporation, Wyoming County, W. Va., two tracks; Morrow—Garaux Bros. Coal Co., Canton, Ohio; Jefferson Co. (Fernwood), Bloomingdale, Ohio; Templeton-Matthews—Dawson-Daylight Coal Co., Dawson Springs, Ky., six tracks with crushing and stoker facilities; Ayrshire Patoka Collieries Corporation, Clinton, Ind., four tracks with provisions for future washer installation.

Tipple reconstruction and revision ranged all the way from complete rebuilding down to the installation of individual vibrating screens and other items for improving preparation of a single size. Crushing installations, as noted, were numerous and there also was considerable activity in the construction of auxiliary screening plants using either shaker or vibrating type equipment for making the smaller sizes, particularly stoker. In many cases, such installations accompanied, or were accompanied by, crushing equipment.

New complete plants employing mechanical cleaning installed or contracted for in 1941 included one with a capacity of 700 tons per hour for the Consolidation Coal Co.'s Jenkins (Ky.) division. The coal will be dumped in the mine onto a belt conveyor, and the plant, designed and built by Fairmont, will include two 13½-ft. Chance cones for 5x1¼-in. coal, American pneumatic separators for 1¼x0, crushing and blending facilities and an 800-ft. refuse belt.

Another 700-ton-per-hour plant, designed and built by McNally-Pittsburg, went into Illinois for the Fairview Collieries Corporation. Equip-

ment includes two McNally-Norton automatic washers for everything under 6-in. after preliminary breaking operations. One is a compound unit. Three McNally-Vissac downdraft dyers are provided for 1¼-in.x½-mm. coal, with equipment for producing nine sizes and selective loading on five tracks. Pennsylvania got a plant with a capacity of 600 tons per hour, viz.: the Duquesne Light installation noted previously. Also, the National Mining Co. contracted with Roberts & Schaefer for a 500-ton-per-hour addition to its Muse (Pa.) operation, including launder-type Hydroseparators and a Hydrotator.

Among other larger new plants in 1941 was the Harmony operation of the Linton-Summit Coal Co., near Sullivan, Ind., designed by Templeton-Matthews and equipped with a Link-Belt air-pulsated jig and Elmore continuous centrifugal dryer. In Ohio, the Hanna Coal Co. placed its new Piney Fork plant, 400 tons per hour, in service. Equipment includes a Link-Belt air-pulsated jig for 6x1¼-in. coal, two additional jigs for 1¼x0, two Link-Belt screen-type heat dryers for 1¼x½ washed coal, and an Elmore continuous centrifugal dryer for minus ½, remixed with the heat-dried product. Final screening, mixing and loading is done in the original Jeffrey tipple.

Other mechanical-cleaning installations handling fairly large tonnages or relatively wide ranges of sizes included the following (major equipment is shown in the accompanying tabulation): Fairmont—Berwind-White Coal Mining Co. (No. 40), Windber, Pa.; Ebensburg Coal Co., Colver, Pa.; Jeffrey—J. C. Jamison (Edna), Brady, W. Va.; Jamison Coal & Coke Co. (No. 9), Farmington, W. Va.; Montana Coal & Iron Co.,

Washoe, Mont.; Raleigh Coal & Coke Co., Raleigh, W. Va. (two plants); Tennessee Coal, Iron & R.R. Co., Birmingham, Ala.; Link-Belt—Enos Coal Mining Co., Oakland City, Ind.; Maxton Coal Co., Morris Run, Pa.; Utilities-Elkhorn Coal Co., Esco Ky.; McNally-Pittsburg—Jones & Laughlin Steel Co., Pittsburgh, Pa.; New River & Pocahontas Consolidated Coal & Coke Co., Havaco, W. Va.; Windsor Coal Co., New Castle Station, Mo.

Several unit washeries, in addition to those included in the above listing, also were installed in 1941, some handling a wide range of sizes. Activity in mechanical cleaners of various types for handling individual sizes, screenings or fines also was marked. Several Kanawha-Belknap chloride washers for egg, stove, nut and similar grades, for example, went into service in southern West Virginia.

New coal-washing tables ("Super-Duty No. 7" or general-purpose "Diagonal-Deck" Deister-Overstrom units, some with "Concenco" revolving feed distributors) went into Alabama, Tennessee, Pennsylvania and Illinois. Most were for the finer sizes of coal, but one installation, for the Schuyler Coal Co., Rushville, Ill., was designed for coal up to 1 1/4 in. in size. Hydro-separator washing equipment was adopted by several companies in West Virginia and Pennsylvania. Dry-cleaning equipment for individual sizes, generally 3/4 in., 1/4 in. or smaller, included Stump "Air Flow" units for six mines in West Virginia and Pennsylvania. The Republic Steel Corporation installed a combination Stump "Air Flow" and Hydro-tator plant at its Indianola (Pa.) mine to clean 1 1/2-in. machine cuttings.

Drying installations, in addition to those already noted, included Elmore continuous centrifugal units for the Union Collieries Co. (No. 3), Renton, Pa., and the Peabody Coal Co. (No. 7), Kincaid, Ill. Two McNally-Vis-sac upward-current heat dryers were installed by the Seneca Coal & Coke Co., Catoosa, Okla., (1x0), with additional installations for the Sentry Coal Mining Co., Madisonville, Ky. (3/4 in. x 1 1/2 mm.), and the Ayrshire Patoka Collieries Corporation, Staunton, Ind. (1 1/4 x 1 1/4 in.). Carpenter centrifugal dryers, vacuum filters and a Dorr thickener accompanied the new Jones & Laughlin washing installation previously noted. In Utah, the Utah Fuel Co. installed a slurry reclamation plant at its Castle Gate preparation plant.

War-Preparation Planning

ONE outgrowth of the present war effort naturally is a demand for more coal. And if developments in the last war are any criterion, an important consideration in the future will be maximum reduction in impurity content, moisture content and other extraneous material. Two major considerations are responsible for this conclusion: (1) a proportionate alleviation of the burden on transportation facilities, as rock, water, etc., not only are useless but take up space that could be devoted to moving coal, and (2) maximum efficiency in use, especially in steam raising and metallurgy.

It may be assumed that coal for

steam and metallurgical purposes will become more important, although this does not mean that domestic coal will take a back seat. In fact, as other fuels go more and more for industrial and military purposes, coal may be expected to take up the slack in the home-heating field. Here, also, good preparation is essential for economy and efficiency in use.

Judging from developments in the last war and the trend of thought so far in the present conflict, steps toward a simplification of sizing may be expected to come up for consideration. Greater attention to the reclamation of fines, middlings and other material also may be looked

New Bituminous Preparation Facilities in 1941 *

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Alabama Power Co.	Birmingham, Ala.	60	Jeffrey ¹
Alpha Coal Co.	Alpha, Ill.	125	Link-Belt ²
Ames Mining Co.	Elmo, W. Va.	200	Kanawha ³
Ayrshire Patoka Collieries Corporation	Clinton, Ind.	450	Templeton-Matthews ⁴
Bell & Zoller Coal & Mining Co.	Staunton, Ind. (2)	160	McNally-Pittsburg ⁵
Berwind-White Coal Mining Co. (No. 4)	Zeigler, Ill.	330	Link-Belt ⁶
Berwind-White Coal Mining Co.	Windber, Pa.	150	Fairmont ⁶
Berwind-White Coal Mining Co.	St. Michael, Pa. (3)	100	Roberts & Schaefer ⁷
Berwind-White Coal Mining Co.	Windber, Pa.	235	Roberts & Schaefer ⁸
Black Diamond Coal Mining Co.	Windber, Pa.	50	Roberts & Schaefer ⁹
Blue Diamond Coal Co.	Blocton, Ala. (6)	90	Deister Concentrator ⁹
Blue Diamond Coal Co.	Chevrolet, Ky.	100	McNally-Pittsburg ¹⁰
Blue Diamond Coal Co.	Bonny Blue, Va.	200	McNally-Pittsburg ¹⁰
Boone County Coal Corporation	Eagan, Tenn.	100	McNally-Pittsburg ¹⁰
Borderland Collieries Corporation	Sharpley, W. Va.	225	Link-Belt ¹¹
Brule Smokeless Coal Co.	Jeffrey ¹	75	Jeffrey ¹
Carbon Fuel Co. (No. 5)	Borderland, W. Va.	50	Kanawha ¹²
Carter Coal Co. (Olga No. 1)	Otsego, W. Va.	50	Kanawha ¹²
Carter Coal Co. (Olga No. 2)	Republic, W. Va.	200	Kanawha ¹²
Cinderella Coal Co.	Coalwood, W. Va. (3)	270	Kanawha ¹²
Cinderella Coal Co.	Juno, W. Va. (3)	275	Kanawha ¹²
Consolidation Coal Co. (No. 214)	Big Creek, Ky.	150	Link-Belt
Consolidation Coal Co.	Dante, Va.	175	Link-Belt ¹¹
Consolidation Coal Co.	McRoberts, Ky.	250	Fairmont ¹¹
Cornett-Lewis Coal Co.	Jenkins, Ky.	700	Fairmont ¹³
Crozer Coal & Coke Co. (Crozer)	Louellen, Ky.	150	McNally-Pittsburg ¹¹
Crystal Block Coal & Coke Co.	Elkhorn, W. Va.	125	Roberts & Schaefer ¹⁴
Dawson Coal Co.	Rawl, W. Va.	30	Kanawha ¹²
Dawson-Daylight Coal Co.	Clarksburg, W. Va.	150	Roberts & Schaefer ¹¹
DeBardeleben Coal Corporation	Dawson Springs, Ky.	300	Templeton-Matthews ²
Dunedin Coal & Coke Co.	Sumiton, Ala.	15	Deister Concentrator ¹⁵
Duquesne Light Co.	Sipsey, Ala.	15	Deister Concentrator ¹⁵
Dye Coal Co.	Terry, W. Va. (2)	60	Kanawha ¹²
Eagle Hill Coal Co.	Greensboro, Pa.	600	Roberts & Schaefer ¹⁶
Ebensburg Coal Co.	Hopedale, Ohio	125	Morrow
Elk Horn Coal Corporation	Mill Creek, Pa. (3)	60	Wilmot ¹⁷
Elmira Coal Co.	Colver, Pa.	85	Jeffrey
Enos Coal Mining Co.	Wayland, Ky.	235	Fairmont ⁶
F. C. Morgan Coal Co.	Wayland, Ky.	600	Jeffrey
Fairview Collieries Corporation	Excelsior Springs, Mo.	80	Roberts & Schaefer ¹⁸
Garaux Bros. Coal Co.	Oakland City, Ind.	300	Deister Concentrator ¹⁵
Glogora Coal Co. (Blue Pennant)	Fairview, Ill.	300	Link-Belt ¹⁹
Gulf Mining Co.	Canton, Ohio	200	Link-Belt ⁵
Gulf, Mobile & Ohio R. R.	Red Dragon, W. Va.	300	McNally-Pittsburg ²⁰
Hanna Coal Co.	Crab Orchard, W. Va.	40	Morrow ²
Heasley Coal Co.	Sparta, Ill.	60	Fairmont ⁸
Hickory Grove Coal Mining Corporation	Piney Fork, Ohio	400	Kanawha ¹²
Hume-Sinclair Coal Mining Co.	Nanty Glo, Pa.	100	McNally-Pittsburg ²¹
Hunter Coal Co.	Jasonville, Ind.	300	Cent. & Mech. Ind. ²²
Ill-Mo Coal Co.	Tiger, Mo.	600	Roberts & Schaefer ¹¹
Island Creek Coal Co. (No. 1)	Antrim, Pa. (2)	100	Jeffrey
Island Creek Coal Co. (No. 14)	Holden, W. Va.	25	McNally-Pittsburg ²³
Island Creek Coal Co. (No. 20)	Holden, W. Va.	100	Link-Belt ²²
Island Creek Coal Co. (No. 22)	Holden, W. Va.	100	Cent. & Mech. Ind. ²²
J. C. Jamison (Edna)	Holden, W. Va.	100	Roberts & Schaefer ¹⁵
Jamison Coal & Coke Co. (No. 9)	Brady, W. Va.	200	Kanawha ⁵
Jefferson Co. (Fernwood)	Farmington, W. Va.	140	Kanawha ⁵
Johnstown Coal & Coke Co.	Bloomington, Ohio	150	Kanawha ⁵
	Crichton, W. Va.	120	Kanawha ⁵

for, as saving a ton in this respect is the same as a similar increase in new production.

Accomplishing these objectives, depending upon the character of the coal, market demand, equipment already in service, etc., may necessitate substantial investments in new equipment, which, like other mining equipment, may be more difficult to obtain. But if such investment was warranted in peace time, it is even more so in the present war effort. With these considerations in mind, some suggestions for preparation planning for war conditions are given below.

Increased use of mechanical cleaning. Coal and market should be carefully investigated to see if a new complete plant would be a worthwhile investment or if cleaners can be installed for preparing certain specific sizes.

Improved hand picking, including, if necessary, lengthening of present equipment or installation of additional units to make possible a better job.

Investigation of the possible effects of increased demand for industrial coal on the present preparation set-up, accompanied by a study of methods which might be adopted to meet the situation.

Study of the possibilities of a size simplification and how it might be accomplished.

Increased attention to blending and mixing practices, particularly in the field of "prescription" sizing.

Improved crushing practices and equipment.

Extension of preparation, if not already the practice, to include reclamation, cleaning and drying of slurry and other fine sizes; re-treatment of middlings and salvage of coal from pickings, cleaner reject and mine refuse.

Extension of drying and improvement of methods, including more or better dewatering screens, and the installation of mechanical and heat dryers.

Increased use of practices designed to make coal more convenient and prevent firing troubles, such as dust-proofing and tramp-iron removal.

Closer control of product, including improved sampling practices and equipment, adequate laboratory facilities and the necessary trained personnel.

Improved control of mechanical cleaner operation, including installation of automatic control equipment where possible.

New Bituminous Preparation Facilities in 1941 *

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Jones & Laughlin Steel Corporation (Hazlewood)	Pittsburgh, Pa.	160	McNally-Pittsburg ²⁵
Lillybrook Coal Co.	Killarney, W. Va.	80	Kanawha ¹⁴
	Lillybrook, W. Va.	50	Kanawha ¹²
	Lillybrook, W. Va.	50	Kanawha ²⁸
Linton-Summit Coal Co. (Harmony)	Sullivan, Ind.	400	Templeton-Matthews ²⁷ McNally-Pittsburg ²⁷ Cent. & Meech, Ind. ²⁷ Link-Belt Kanawha ¹² Morrow
MacAlpin Coal Co.	McAlpin, W. Va.	50	Link-Belt ¹⁹
Maxton Coal Co.	Morrisdale, Pa.	250	Roberts & Schaefer ⁸ Jeffrey ¹
Monroe Coal Mining Co.	Revloc, Pa.	100	Roberts & Schaefer ¹⁸
Montana Coal & Iron Co.	Washoe, Mont.	100	Jeffrey ¹
Morris Run Coal Mining Co.	Morris Run, Pa.	100	Roberts & Schaefer ¹⁸
National Mining Co.	Muse, Pa.	500	Roberts & Schaefer ²⁸
New River Co.	Oswald, W. Va.	200	Jeffrey
New River & Pocahontas Consolidated Coal & Coke Co. (No. 9)	Havaco, W. Va.	175	McNally-Pittsburg ²⁸
New York Coal Co.	Nelsonville, Ohio	150	Jeffrey ¹⁹
Page Coal & Coke Co.	Page, W. Va.	200	Roberts & Schaefer ⁸
	Page, W. Va.	250	Roberts & Schaefer ⁸
Peabody Coal Co. (No. 7)	Kincaid, Ill.	50	Cent. & Meech, Ind. ³⁰
Peerless Coal & Coke Co.	Vivian, W. Va.	325	Roberts & Schaefer ⁸
Pittsburgh Coal Co.	Montour, Pa.	1,000	Roberts & Schaefer ¹¹
Pittsburgh Coal Co. (Champion No. 1)	Champion, Pa.	175	Link-Belt ⁵
Pond Creek Pocahontas Co. (No. 3)	Bartley, W. Va.	80	Kanawha ⁵
Princess Elkhorn Coal Co.	Prestonsburg, Ky.	300	Kanawha ¹²
	Prestonsburg, Ky.	105	Link-Belt ¹⁹
Rail & River Coal Co. (No. 4)	Stewarts, Ohio	125	Morrow
Raleigh Coal & Coke Co. (No. 3)	Raleigh, W. Va.	250	Jeffrey ¹⁹
Raleigh Coal & Coke Co. (No. 7)	Raleigh, W. Va.	150	Jeffrey ¹⁹
Raleigh-Wyoming Mining Co.	Glen Rogers, W. Va. (4)	200	Kanawha ¹²
Red Jacket Coal Corporation	Coal Mountain, W. Va.	250	Fairmont ²
Red Parrot Coal Co.	Prenter, W. Va.	100	Kanawha ⁵
Republic Steel Corporation	Virginia, Ala.	250	Roberts & Schaefer ²⁰
Rivercoal, Inc.	Indianola, Pa.	100	Roberts & Schaefer ²¹
Rochester & Pittsburgh Coal Co.	Bellaire, Ohio	50	Jeffrey ¹⁹
Rosedale Coal Co.	Indiana, Pa.	50	Deister Concentrator ¹⁴
St. Louis, Rocky Mountain & Pacific Co.	Maidsville, W. Va.	125	Interstate Engrs. ³²
Schuyler Coal Co.	Brilliant, N. M.	60	Jeffrey ³⁶
Seotia Coal Co.	Rushville, Ill.	80	Deister Concentrator ³
Semet-Solvay Co.	Brooklyn, W. Va.	50	McNally-Pittsburg ²⁹
Seneca Coal & Coke Co.	Harewood, W. Va.	450	Kanawha ²⁷
Sentry Coal Mining Co.	Catoosa, Okla. (2)	150	McNally-Pittsburg ¹
Slab Fork Coal Co.	Madisonville, Ky. (2)	200	McNally-Pittsburg ¹
Southern Coal & Coke Co.	Slab Fork, W. Va.	300	McNally-Pittsburg ¹¹
Star Coal Co.	Boothton, Ala. (2)	30	Deister Concentrator ³
Star Mining Corporation	Sheridan, Wyo.	15	Link-Belt ⁵
Stover Smokeless Coal Co.	Salem, Ohio	60	Jeffrey
Tennessee Coal, Iron & R. R. Co.	Stonewall, W. Va.	200	Kanawha ²
Tennessee River Coal Co.	Birmingham, Ala. (2)	200	Jeffrey ²⁷
Tierney Mining Co.	Dayton, Tenn.	32	Deister Concentrator ¹⁴
Truax-Traer Coal Co.	Stone, Ky.	200	Link-Belt
United Thacker Coal Co.	Marfork, W. Va.	50	Kanawha ⁵
U. S. Coal & Coke Co. (No. 10)	United, W. Va.	50	Kanawha ²
Union Collieries Co. (No. 3)	Delbarton, W. Va.	75	Jeffrey ³¹
Utah Fuel Co.	Wilcoe, W. Va.	1,000	Link-Belt ²⁸
Utilities Elkhorn Coal Co.	Renton, Pa.	50	Cent. & Meech, Ind. ³⁰
Winding Gulf Collieries	Castle Gate, Utah	25	Link-Belt ¹⁹
	Sunnyside, Utah	250	Link-Belt ¹²
Windsor Coal Co.	Eseo, Ky.	300	Link-Belt ⁴⁰
Wyatt Coal Co.	Goodwill, W. Va.	100	McNally-Pittsburg ¹⁴
	Winding Gulf, W. Va.	150	McNally-Pittsburg ¹⁴
	Windsor, Mo.	200	McNally-Pittsburg ²⁹
	Sharon, W. Va.	250	Kanawha ⁵

*Also includes installations of preparation equipment in existing structures. Where information indicates that more than one equipment unit is installed, the number ordinarily is given in parentheses after the plant address.

¹Diaphragm-jig equipment. ²Complete new plant. ³New preparation plant with Kanawha-Belknap chloride washing equipment. ⁴McNally-Vissac thermal-drying equipment. ⁵Crushing installation and auxiliaries.

⁶Chance-cone washing installation. ⁷Stump "Air-Flow" cleaning equipment and auxiliaries. ⁸Crushing and screening installation. ⁹No. 7 coal-washing-table equipment and "Concenco" revolving feed distributor. ¹⁰Type A breaker equipment with integral screening, sold through W. J. Savage.

¹¹Crushing and screening equipment. ¹²Kanawha-Belknap chloride washing equipment. ¹³Complete new preparation plant including two Chance cones and American air tables for 14 x 0. ¹⁴McNally-Norton breaker equipment. ¹⁵"SuperDuty Diagonal-Deck" or general-purpose "Diagonal-Deck" Deister-Overstrom coal-washing-table equipment.

¹⁶New tipple and river plant, including Hydroseparator coal-washing equipment. ¹⁷Type D jig equipment. ¹⁸Stump "Air-Flow" cleaning equipment and auxiliaries. ¹⁹Washing equipment. ²⁰Including two McNally-Norton washers and three McNally-Vissac thermal dryers.

²¹Capacity of unit washery; contract also includes tipple and crushing equipment for 5 x 0 railroad fuel. ²²New preparation plant, including two Link-Belt air-pulsated jigs, two screen-type heat dryers and one Elmore continuous centrifugal dryer, 40 t.p.h. ²³Raw-coal breaking equipment and sizing screens. ²⁴Baum-type jig. ²⁵McNally-Rheo washer, Carpenter centrifugal drying equipment, Dorr thickener, vacuum filters, etc.

²⁶Hydroseparator coal-washing equipment and auxiliaries. ²⁷Forwarded from 1940; new preparation plant designed by Templeton-Matthews, including McNally-Norton washing equipment and Elmore continuous centrifugal dryer, 70 t.p.h. ²⁸Preparation-plant addition including Hydrotator and Hydroseparator coal-washing equipment. ²⁹McNally-Norton washing equipment. ³⁰Elmore continuous centrifugal dryer.

³¹Tipple reconstruction. ³²American air tables, "Selectro" screens, storage and loading bins, etc. ³³Mine-run tipple with Bradford breaker. ³⁴Hydrotator and Stump "Air-Flow" plant for machine cuttings. ³⁵River and truck-loading plant.

³⁶Unit washery. ³⁷Alterations to river plant. ³⁸Tipple equipment. ³⁹Slurry-reclamation plant. ⁴⁰Washing and drying equipment.

ELECTRICAL POWER—

1941 Coal-Mine Developments; How It Can Better Serve the War Effort

ELECTRICITY, industry's most efficient tool, enters into nearly every form of power use at modern coal mines, including the operation of compressors, which are links in the chain from energy source to face use at many anthracite properties. On adequate electric power and its efficient delivery to the face depends largely the maintenance or increase of production per machine unit and per man-shift that coal will contribute to the war effort. Also, a saving in power is equivalent to an increase in fuel production of equal or greater magnitude, and luckily an increase in transmission and utilization efficiency always is paralleled by a reduction in total power per unit of output.

The year 1941 brought out several new developments in electric power for coal mines, but the more noteworthy progress was along the lines of already proved ideas. The outbreak of the war, however, makes it all the more imperative to survey all the electrical improvements and practices of the last few years and put into use all those that fit the individual operation and local conditions. And the necessity for taking all possible steps to meet expected war-time demands also should generate a disposition to beat the gun on those developments which otherwise would come along gradually.

Good power used in efficient equipment is an undeniable first in mechanical mining, and, unlike mine layout, roof control, etc., is not dependent to any marked degree on natural conditions. Getting good power is up to the engineering management. The following material presents some suggestions to that end, along with notes on late developments in the field of electrical power for coal mines.

Underground D.C. Service— In the Section

Substations as close as possible to the load center (not over 2,500 ft. from the working face for 275 volts). Shortening the distance is equivalent to increasing the size of the d.c. feeders and can be a means of releasing copper for other uses.

Feeder cables in 500,000- and 1,000,000-cir.mil sizes to the neck of the farthest room.

Room-entry feeders made up in 50- to 200-ft. lengths with brazed or soldered terminals for making bolted joints, thus facilitating installation and removal in rapid mining.

Utilization of the rails in semi-permanent tracks to the fullest extent as a power return by applying welded or recoverable-type bonds with driven wedges.

Auxiliary ground cables paralleling

the rails and tied in at 200- to 400-ft. intervals with cross bonds where loads are heavy.

Regular face tests with voltmeters (preferably the graphic type) and prompt revision of distribution practices if 250-volt motors are being served with less than that voltage.

Oversized trailing cables in minimum lengths for regular duty. It is bad practice to carry long cables on production units for infrequent jobs; better to use an extension in such cases.

Automatic overload breakers—reclosing type preferably—on branch feeders.

Use of stationary storage batteries floating on the line to supply extra d.c. capacity during peaks and help hold voltage to normal.

Load-balancing relays, such as the I-T-E, to prevent locomotives hogging available power at the expense of face equipment.

Possible extension of the practice, at some mines, of installing separate circuits for drilling, cutting and loading.

Underground D.C. Service— Main Haulage

Substations not over one mile apart (275-volt systems).

Automatic reclosing tie and feeder breakers.

Load-balancing relays to prevent overloading by heavy locomotives passing close to substation.

Use of 400,000-cir.mil Fig. 9 deep-section grooved trolley wire.

Use of 500,000- to 1,000,000-cir.mil feeders paralleling trolley.

Voltage measurements on locomotives and prompt attention to service if voltage drops below 250 on long stretches or below 225 on short heavy

Several new developments and even more noteworthy progress in the application of ideas already proved practicable featured electrical work at coal mines in 1941, while the outbreak of war focused even greater attention on power's part in getting out coal. This article, therefore, attempts the dual task of presenting major 1941 developments in brief and spotlighting the things that might be done to improve both a.c. and d.c. power service to underground and surface equipment while also saving energy.

pulls (275-volt mine-power systems).

Welded bonds on both rails (two 4/0 bonds on each joint, 80-lb. and heavier) with cross bonds every 200 ft. or solidly welded rail joints, to make full use of the conductivity of the track rails. If main-line rail weight is less than 60-lb., use 500,000- to 1,000,000-cir.mil cable as auxiliary return and cross bond to track every 200 ft.

Where electrical loads are heavy, auxiliary returns may be advisable on track heavier than 60-lb.

Use of stationary storage batteries floating on the line to supply part of the demand on heavy grades and help keep voltage up to normal.

Underground A.C. Service— 220 and 440 Volts

Transformer substations not over 600 ft. from farthest working face (220-volt systems).

Transformer substations on trucks in mines with track gathering haulage.

Transformer substations in the form of compact load-center units, such as General Electric.

Transformers of the Westinghouse "Inerteen" or G. E. "Pyranol" types (non-inflammable cooling liquids), reducing fire hazard and the cost of temporary installations necessary with rapid mining and 220-volt power-supply systems.

Air-cooled transformers, such as the Westinghouse Type ASL with Class B fireproof insulation—light in weight and small and thus more adapted to temporary installations and frequent moves. Use of small transformers of the above types is especially important in thin-coal conveyor mines.

Arresters on the secondary side for

adequate lightning protection at mines where shallow cover permits placing transformers at tops of boreholes.

Regular face tests with voltmeters (graphic type preferred) and immediate attention to distribution if motors rated at nominally 220 volts are operating on a lower average voltage or if the voltage drops as low as 215 on peak loads.

Correcting power factor by capacitors (connected in parallel) installed as close as possible to loads.

Investigation of the possibilities of series-connected capacitors which automatically compensate in the right amount for any value of lagging current (Westinghouse has announced new protectors for capacitors in this duty).

1,000,000-cir. mil cables to the necks of the farthest rooms.

Cables in 50- to 200-ft. sections with brazed or soldered terminals for making bolted joints, thus facilitating installation and removal in rapid mining.

Ground indicators.

Investigation of the possibilities of installing grounded-neutral systems, thus reducing voltage to ground (*Coal Age*, January, 1942, p. 61).

Generously oversized 3-conductor cables in minimum lengths for regular production duty—more important, even, than with d.c. cables.

D.C. Substations

Rectifiers for highest efficiency: tank type; tube types—sealed and pumped Ignitrons with Thyatron tubes and without, the latter fired by a combination of reactors in a special circuit (approximately 25 tube-type rectifiers already in use at coal mines).

Convertor-type substations—next highest in efficiency.

Utilization to the full of power-factor correction, a valuable characteristic of the motor-generator unit, by proper setting and manual control of field current or by automatic power-factor regulation (*Coal Age*, December, 1941, p. 54).

Full lightning-arrester equipment, including capacitors and several grounds in wet soil.

Making underground substations portable, whether rectifier, converter or motor-generator types.

Portable substations with steel covers so special rooms are not necessary under favorable conditions.

Utilization of automatic controls to the best advantage by provisions for remote starting and stopping: saves labor and may reduce idle-time losses.

Installation of load distributors such as the I-T-E, which allows use of smaller units, thus reducing electrical and mechanical losses.

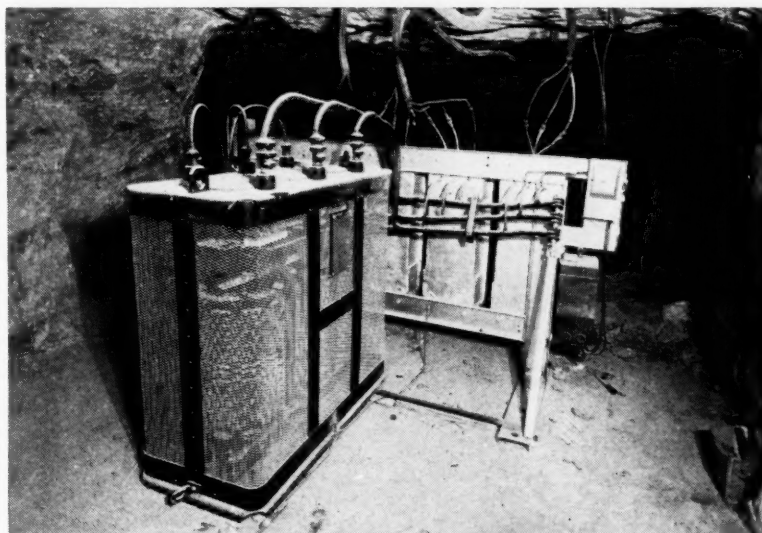
Storage batteries floating on the line between substation and load. These reduce necessary size of substation unit, help voltage and cut power cost.

Operation of as few substation units as possible for idle-day pumping, ventilation or repairing by switching and remote-control provisions.

Fireproof housings for substations which will remain in one location for several years to improve safety and lessen risk of loss; underground fireproof rooms to have doors which close when rope links fuse.

A.C. to Substations And Large Motors

Investigate possibility of raising voltage from 2,300 to 4,000 by recon-



300-kva. air-cooled transformer in mine service.

necting transformers and motors or rewinding.

Lightning arresters and capacitors, with grounds in soil constantly wet.

Relocation of high-line step-down transformers to shorten 2,300-volt distribution to two miles or less if possible.

Installation of oversized pole-line copper.

Limitation of underground-cable distribution by economical use of pole lines and bore holes, considering seam depth and surface ownership.

Installation of oversized underground cables.

Study of the possibilities of series capacitors which automatically compensate in the right amount for any value of lagging current (Westinghouse has announced new protectors for capacitors in this duty).

Use of ground-fault indicators with visual or audible signals or with relay connections to open circuit breakers.

Choice of the shortest possible routes for underground cables, including, possibly, drilling horizontal holes for cable ducts through barrier pillars.

General Considerations

Disconnect large transformers and use small auxiliary units for furnishing limited power for repair and maintenance testing and for lighting on idle days. This saves power.

Investigate possibilities of new compact a.c. generating units, such as the Westinghouse "Simpac," for remote loads and standby service.

Use synchronous motors 75 hp. and over in continuous service applications, such as on fans, blowers, air compressors, motor-generator sets and pumps.

Pay careful attention to setting and adjusting fields on synchronous motors for highest efficiency and maximum benefits.

Make full use of stationary and portable indicating and recording test meters to ascertain operating conditions and check improvements and adjustments. Now available are inkless recording ammeters and voltmeters with 30-in. charts and a speed of 1 in. per day (General Electric).

Use of capacitors close to a.c. induction motors or at load centers of closely grouped motors, thereby improving voltage, reducing heating losses in lines and motors and cutting power consumption, as well as unit cost of power.

Replacement of d.c. motors with a.c. units where possible in tipples and cleaning plants, on slope and shaft

bottoms, and on small fans, blowers and stationary pumps.

Excepting for work-period boosting, charging of locomotive and shuttle-car batteries with motor-generator sets instead of through resistance from trolley.

Limitation of arc welding through resistance from d.c. trolley system to rail bonding and emergency workplace repairs. It is a wasteful practice to use resistance welding regularly in the shop where motor-generator or transformer-type equipment can be employed.

1941 Developments

In addition to those noted in listing items for consideration elsewhere in this article, 1941 developments included:

New system of coil insulation for relays and circuit breakers to prevent corrosion of copper where temperature and humidity are high (General Electric).

New-type transformer construction—one-fourth less weight and improved voltage regulation ("Hipersil," Westinghouse).

New larger locomotives for long heavy-duty hauls. Two General Electric 40-ton locomotives were delivered to the Vesta Coal Co. Each consists of two 20-ton two-motored units in tandem. Total horsepower per locomotive is 600, with ventilation to provide 500 continuously.

Deliveries of new "Tri-Clad" motors using "Formex" insulated wire (General Electric) began to mines. These motors now are available up to 150-hp. in open and splashproof construction.

Continuously variable speed-drive unit powered from a.c. circuit and having a 10:1 range. It consists of an induction motor driving a series d.c. generator connected to series d.c. motor (Westinghouse).

Strip-shovel practice changed to use 0.9-power-factor motor instead of 0.8 because not economical to compen-

sate for lagging current of a preparation plant through a long line; better to use a synchronous motor or capacitor at the plant.

Amplidyne exciter and control of d.c. variable voltage drive on strip shovels and mine hoists to reduce all-day operating losses and simplify the system; can be arranged to definitely limit current of acceleration and retardation.

Locking connections for trailing cables (Ohio Brass Co.).

Experimental work in the development of portable batteries large enough for operating loading machines in gaseous mines. Loaders, depending upon type and size, use from 0.125 to 0.500 kw.-hr. per ton.

Development of a system of reducing voltage at the substation to aid in picking up heavy across-the-line d.c. mine loads by John M. Rairigh, Sterling Coal Co. (January, 1942, *Coal Age*, p. 37).

Shielding of cable conductors against corona by use of conducting rubber instead of metal (American Steel & Wire Co.).

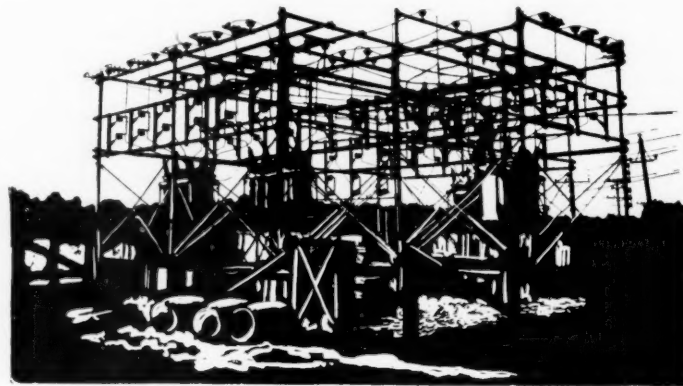
D-type two-conductor parallel-duplex trailing cable with ground wire in space between two D's back to back (Anaconda Wire & Cable Co.).

Broader use of automatic motor starters with remote-control stations, thus making it practicable to shut down equipment during short idle periods.

Wider use of fluorescent lamps, which provide excellent lighting with a lower power consumption. Lamps have been developed for quicker starting at low temperatures.

A.c. welders developed with built-in power-factor correction (General Electric).

Remote-control devices, both hand- and foot-operated, developed to taper off current before breaking the arc at end of bead in welding and to provide quick changes in heat (General Electric).



MINE SUPPLIES

Assume Added Importance In Planning for Coal's War-Time Efforts

OPERATION of the priorities system, if nothing else, indicates the importance of materials, supplies, and parts in the war effort. Economical use and more efficient salvage, not only for reconditioning materials or parts thus recovered but also, where further use is impossible, alleviating the growing shortage of scrap in the United States become even more vital. Proper attention to these phases of the problem has possibilities not only in reducing outlays for new material but also in an increased cash return for scrap items.

While OPM indicates its determination to see that the coal industry gets all the *necessary* equipment, materials and parts it requires for uninterrupted production, it is possible, of course, that scarcities or even shortages will occur in certain items. Even aside from this consideration, the industry could well give thought to obtaining and using substitutes for certain materials more vitally needed elsewhere, and to revisions in practices (some of which are set forth in the articles beginning on pp. 74 and 78) designed to economize in copper, rubber and similar products. With improvement in the supply situation the goal, the following suggestions are offered for consideration.

Supply Organization

Prevention of excessive inventories or shortages, as well as promotion of economy in the use of materials and parts, requires an adequate system of records showing cost and quantities of items received, quantity on hand at any moment, usual rate of consumption, and destination of each item issued by machine number or use classification. Such records also show if certain ma-

chines or mining operations are taking abnormal quantities.

Forecasting requirements so that suppliers and OPM can be advised of possible needs is a desirable objective under present conditions.

Greater stress on holding repairmen, foremen, operators and others receiving or using parts or supplies accountable should result in economy.

Proper storage facilities should prevent waste, loss and damage. Separate bins should be provided for small materials and parts and provisions should be made for locking them in the case of small expensive items. Timber, lumber, steel and heavy machine parts should be stored off the ground and protected from the elements. Adequate fire protection should be provided, not only in supply houses but in yards.

Proper equipment for unloading and storing heavy materials and equip-

ment, such as cranes, derricks, unloading platforms, etc., saves labor and reduces loss or damage. Likewise, proper trucks, cars, etc., will do the same in distribution to the mine.

Promotion of safety and elimination of destruction or loss dictate special attention to provisions for storing, issuing and distributing such inflammable or explosive materials as powder, oil, grease, etc.

Material Salvage

Set up, if necessary, special men or crews to examine all used parts and materials and handle or direct reconditioning work. This step should be supplemented with instructions that all machine parts, etc., be returned promptly for inspection.

Establish depots in each working section and at other logical spots and instruct all employees to deposit



therein all scrap material, no matter how small.

Check scrap piles and all mine sections or abandoned properties possible to enter to see what material can be recovered for possible reworking, re-use or sale as scrap.

Check working methods to see if a greater timber recovery is possible.

Dismantle worn-out or obsolete machinery and structures, salvage items which have a possible use, and dispose of the remainder as scrap.

Substitutes

Treated or untreated wood (preferably the former for permanent or semi-permanent services), concrete or sand-cement mixtures blown on by air for roof support.

Concrete, brick or masonry legs in place of steel posts for direct roof support or holding crossbars.

Wood, if the fire hazard does not prevent; concrete, masonry, etc., in walls, structures, foundations, tanks,

bins and similar mining structures.

Wood, fiber, asbestos compounds, tile and similar materials for pipe lines, both underground and on the surface. In addition to saving steel, such lines also offer a valuable corrosion-resisting characteristic.

Better utilization of steel rails in mine tracks by proper bonding or welding of joints, thus releasing copper for other uses.

Investigation of other substitute possibilities.

MAINTENANCE

Moves More Into the Spotlight; How It Can be Improved for the War Effort

SHORTLY after the United States was plunged into the present war, an industrial executive asked a mining engineer what phase of coal mining presented the best opportunity for improving productive efficiency and conserving materials for the war effort. "Maintenance," was the reply. "Cut down machinery breakdowns," he added, "by perfecting preventive maintenance, which automatically reduces new parts requirements."

Many of the developments of the last year point the way to wider adoption of new maintenance methods which will increase coal production, reduce upkeep cost and, by reciprocal action, cut the cost per ton. At the time when the industry is most concerned with the immediate future it is fortunate that improving maintenance is one activity that for the most part need not wait for the delivery of some particularly scarce material.

Two primary factors stand out in those programs which have resulted in better maintenance. These are: (1) personnel training and department management and organization, and (2) mechanical and electrical technique. Assuming that personnel training has been taken care of and the management factor provided for, it follows that the right men are on the

Keeping equipment on the job all the time is now more important than ever in coal mining. Setting up the proper maintenance system requires trained personnel, a sympathetic management and a knowledge of the latest in technique, including lubrication, relieving mechanical shocks, shop equipment and methods, welding and metallizing, and electrical advances.

job and will adopt or urge the use of the best technical practices within their knowledge. With this in mind, the following suggestions are offered for consideration.

Organization and Management —Maintenance Training

Excellent maintenance prevails only where the top executives believe that thereby production is increased and over-all costs are reduced; further, that the cost of proper maintenance may be less in the long run than the cost of poor maintenance.

The head of the maintenance de-

partment and the maintenance foremen must be in full sympathy with the company aims of increased production and lower cost.

Thorough training of mechanics by coal-company staffs or in mining-school extension classes teaches cleanliness, systematic procedure, need for proper tools, importance of lubrication, fundamental principles and considerable of the actual technique. Impossibles are weeded out.

Mine foremen and other executives given the same maintenance training as the mechanics are better fitted to cooperate in the preventive-maintenance program.

Inspection each shift, daily or weekly, depending upon the machine and duty, reveals the "stitch-in-time" jobs.

Brief written reports and records of machine or unit condition prevent buck-passing and pin responsibility on specific parts or persons.

A clean, convenient, well-lighted and properly heated and ventilated shop or place for repair work is the first step toward insuring that a competent man will do a good job.

Time is necessary for inspection and maintenance jobs. Time out because of unexpected breakdowns is

lessened by having built-up spare units of a machine ready for quick exchange.

Mechanical Technique— General Items

Three-shift operation multiplies the maintenance problem as compared with double-shifting. Lunch and between-shift periods can be utilized for lubrication, inspection and running repairs. With multiple-shifting, weekly inspections and heavier repairs must reach further into prevention of breakdowns.

Most electrical failures on underground machines are caused by mechanical failures. Faulty lubrication is the cause of a very large percentage of mechanical failures.

Handy and safe repair equipment and special tools and units for transporting, repairing and installing replacement parts or units may cut the time of a job to one-fourth that formerly required.

Delays can be reduced by keeping a small, judiciously selected stock of repair parts in or close to the working section.

Periodic general overhauls of entire machines or certain machine units may be based on inspection, time, tonnage or delay figures, but some system should be set up to determine when action should be taken.

If the main shop is more than a mile from the working sections, an auxiliary shop probably is advisable.

Lubrication

Grease or oil should be of the proper density and composition.

Bearings, bearing housings, seals, cases and auxiliaries should be kept in tip-top shape or redesigned and rebuilt to prevent lubricant loss.

Troublesome bronze sleeve bearings should be replaced, where practicable, with anti-friction bearings, thus simplifying lubrication and releasing metals in which a shortage impends.

Replace old-type with sealed anti-friction bearings where duty favors.

Add drip lubricators, wool-yarn reservoirs or centralized feed systems to coal- and rock-handling machinery, conveyors and other special parts needing a constant or frequent lubricant feed.

Lubricants should be kept clean by filling portable containers in clean places and transporting and handling them only in tightly closed containers or in guns and portable greasing machines.

Where several loading machines and mounted cutters are in service, provide a special lubricating truck with power-driven (electrical or compressed-air) pumps and volume meters.

Maintain simple, brief records of lubrication of important machines—or at least the troublesome units on such machines.

Relieving Mechanical Shocks

Use springs and rubber mountings

between metal parts to dampen transmission of force and energy.

Use air cushions or shock absorbers where possible, as on guy cables of booms on dragline strippers (*Coal Age*, September, 1941, p. 57).

Investigate possibilities in a wider application of hydraulic oil controls of the piped and unit types to effect movements of machine units, for operation of locomotive brakes and for numerous other duties where it is desirable to eliminate gearing, substitute power for manual operation and effect remote control, thus making a labor saving, reducing mechanical wear and shock, and promoting safer operation.

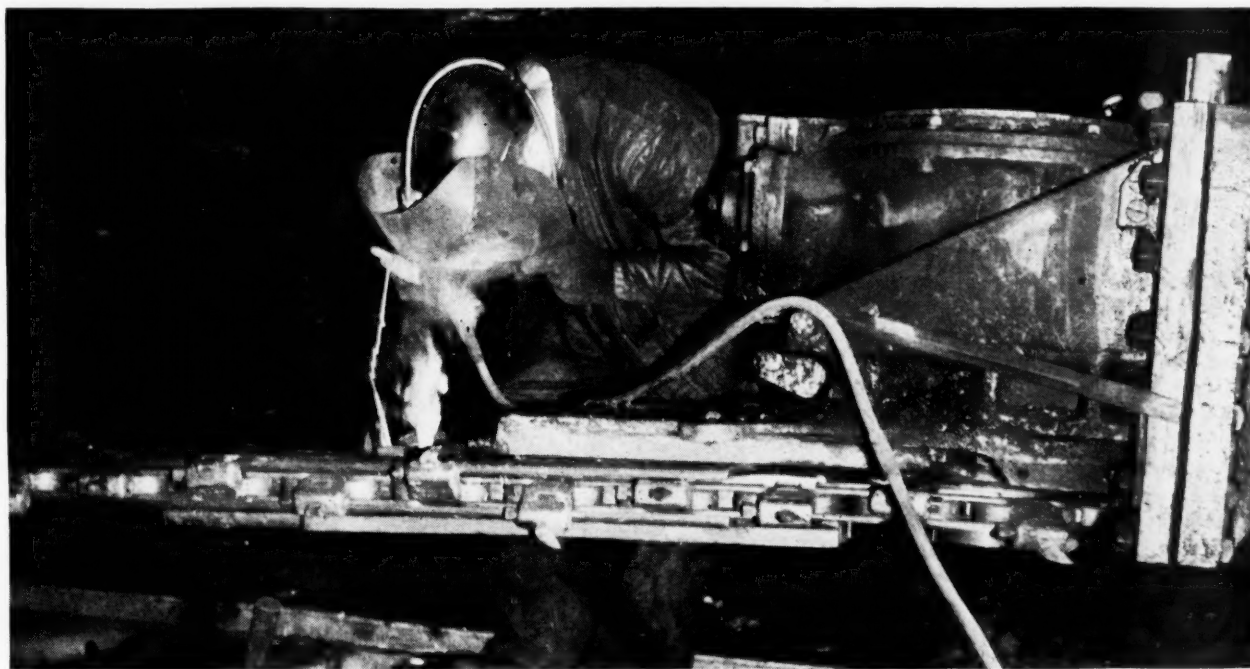
Check on possibilities of a wider use of fluid drives of the traction and variable-speed types between power unit and load, thus reducing both mechanical and electrical failures and saving shearing-pin delays on certain drives, such as on crushers, conveyors, etc.

Investigate possibility of wider application of fluid centrifugal brakes on retarding units for car and monitor planes, on hoists and on motor trucks (*Coal Age*, August, 1941, p. 54).

Shop Equipment and Methods

Recondition lathes and machine tools so that mechanics can do the accurate work necessary with improved mining machinery.

Provide an adequate supply of twist drills, preferably of high-speed



Welding is now a major tool in coal-mine maintenance.

steel, with grinders for sharpening to the proper angle and clearance.

Mechanics relieved of heavy lifting will do better work and complete jobs quicker with less danger of injury. Shops and repair pits therefore should be equipped with bridge, jib or floor cranes and with monorails carrying trolley-hung chain blocks.

Provide a bench drill for use on small work instead of employing the large drill press or radial drill.

Provide high-intensity illumination and adequate extension cords and receptacles. The new 110/6-volt transformers and the new standard-base 6-volt lamps permit use of shockproof extension cords and stronger lamps (*Coal Age*, January, 1942, p. 68).

Oxygen and acetylene piped to convenient outlets in shops and surface plants from generators or tank manifolds save time and reduce costs.

Bending and breakage in mine cars, in certain machine parts and in certain structural elements can be reduced by using high-strength steels.

Corrosion and wear on cars, pumps, preparation equipment, etc., can be reduced by using proper alloys.

In underground maintenance, tool cars and power-driven man cars facilitate emergency repairs by getting men quickly to the job without tiring effort and by eliminating delays growing out of waiting for special tools.

Welding and Metallizing

Welding is a major maintenance tool at coal mines. Therefore both the top works and the underground workings should be generously equipped with stationary and portable outfits to eliminate waits for welding equipment and render unnecessary doing a job by a less satisfactory, more costly and longer-time method.

Maintain a diverse stock of gas-weld and brazing filler rods and electrodes to take full advantage of the numerous welding possibilities.

Employ cutting and welding to use up all former scrap in construction and repair jobs.

Hard-surface all parts used in cutting, digging, drilling and materials handling, as well as certain machine parts where severe metal-to-metal contact or wear occurs.

Weld to eliminate unnecessary weight, reduce cost and eliminate replacement of loose rivets.

Weld to build up all worn metallic surfaces except where metallizing may be better adapted.

Flame cutting saves time, labor, expense and possible delays in the pur-

chase of new metal saws and tools.

Jigs for accurate alignment and prevention of warping in parts to be welded save their cost in a few operations.

Use welded bonds or weld the rail joints in permanent tracks, thus improving power service, saving materials and making possible, under some circumstances, the salvage of used bars and bolts.

Fill wheels and tire wearing surfaces on locomotives, cutting- and loading-machine trucks, mine cars, etc. Deeply grooved wheels may be bonded or completely filled with electrode if the proper technique is followed.

Use the metallizing process to bring back to standard the bearing sections of armature shafts or heat-treated parts where the heat of welding would introduce difficulties, or where wear is slight and tolerances are narrow.

Protect steel surfaces by metallizing with coating of anti-corrosive metals.

Electrical Technique

Improve lighting protection for power lines, cables and electrical apparatus by including capacitors and maintaining low-resistance grounds to soil that is always damp or wet.

Keep fuses properly filled and breakers and relays properly adjusted and in good operating condition. This saves destruction of and damage to cables, wiring, controls, transformers and motors.

Cleanliness, maximum protection from dust and moisture, and adequate ventilation to prevent high temperatures should be the watchwords with d.c. substation equipment.

Thorough weekly inspections and reconditioning of brushes, holders and

control apparatus important with d.c. substations.

Adequate cross bonding and grounding of steel armor and lead sheaths of power or signal cables prevent electrolytic corrosion. Copper-oxide cathodic protection is an alternative. The newer cables without metallic coverings are immune to this difficulty.

Neglected or inherently faulty lubrication of motors causes numerous electrical failures because of worn bearings and grease-soaked insulation.

Continued operation of a.c. or d.c. motors on low voltage is a basic obstruction to good maintenance.

Tests will show if certain motors are overloaded. The remedies include forced ventilation, reducing the load, replacing with a larger motor or rebuilding the windings.

Rewind motors with old-type, low-temperature insulation with wire of the same size with glass or asbestos insulation, or with larger wire with homogeneous synthetic insulation.

Maintain covers of controls and switches in a dust-tight condition. Install older-type mechanisms in new cases or add sponge, pliable or springy gaskets to improve tightness.

Install a system of inspection, dressing and lubrication of contacts, with due regard to experience and severity of service, which will forestall heating, severe abrasion and sticking.

Install approved motor-driven ventilators on explosion-tested d.c. controllers subject to severe service. The need is much greater with 550 than with 275 volts.

Early exchange of damaged trailing cables for ones repaired by vulcanizing or rebuilt by the same process, using good parts of used cables, will save both cable and rubber.



ALL-TIME RECORD

Made in Coal-Mine Safety With Industry Fatality Rate Down to 2.25

COAL MINING in the United States established an all-time safety record in 1941. The death rate per million tons of coal produced reached the lowest point ever recorded. Bituminous mines, considered separately, likewise had the lowest fatality rate on record, while the rate for Pennsylvania anthracite mines, though higher than in 1940, was lower than in any year prior to 1940. Production of coal greatly exceeded that in 1940, especially at bituminous mines.

Although reports for December had not been received when this paper was written and although information for the 11 months January to November was subject to revision because of additional deaths that might result later from serious injuries during the 11-month period, estimates of final figures for the full year place the number of fatalities during 1941 at 1,256. Of these deaths it is estimated that 1,052 fatalities occurred at bituminous mines in various States and 204 fatalities at anthracite mines in Pennsylvania. Production of coal in 1941 exceeded that of 1940, output being estimated at 558,300,000 tons, including 504,100,000 tons of bituminous coal and 54,200,000 tons of anthracite.

Should these estimates be confirmed by final reports for the year, the fatality rate for 1941 will be revealed as 2.25 per million tons of coal produced, compared with 2.71 for 1940. Preliminary reports for bituminous mines indicate that the fatality rate for that class of mines was 2.09, comparing favorably with the rate of 2.61 for the same class of mines in 1940. Reports for Pennsylvania anthracite mines indicate a rate of 3.76 per million tons, which was somewhat less favorable than the previous year's rate of 3.57. For each death the production of coal

With an estimated fatality rate of 2.25 per million tons (1.55 per million man-hours worked), the coal industry of the United States hung up an all-time safety record in 1941. Reduction in deaths from explosions was a major factor in the record, the rate per million man-hours worked dropping from 0.489 in 1940 to 0.150 in 1941.

By R. R. SAYERS

Director, U. S. Bureau of Mines

averaged 444,500 tons, representing an average of 479,200 tons for bituminous mines and 265,700 tons for anthracite mines. Except for anthracite, this record compares favorably with that of 1940, when the average production was 369,500 tons per fatality, the average for bituminous mines in that year being 383,100 tons and that for anthracite mines 279,800 tons.

Measured on the basis of the estimated number of man-hours worked, the fatality rate was 1.55 per million man-hours, which compares favorably with the final rate of 1.86 for 1940. The per-million-man-hour rate for bituminous mines alone is estimated at 1.54, indicating an improvement over the previous year's rate of 1.92. Correspondingly, the rate per million man-hours for anthracite mines in Pennsylvania, estimated at 1.58 for 1941, shows a slight increase over the rate of 1.50 for 1940.

Eight major disasters—accidents causing five or more deaths each—occurred in 1941, with a total of 73

deaths. Seven of the disasters, with a total death toll of 66, were explosions of gas or dust underground; one disaster, resulting in the death of seven persons, occurred in an open-cut mine. This record, though regrettable, represented an improvement when compared with 1940, when six major disasters caused the death of 276 men. Of the eight major disasters in 1941, reports showed that two occurred in Alabama and caused 16 deaths, two were in Illinois and caused 15 deaths, one was in Kentucky and resulted in 15 deaths, one in Indiana with 14 deaths, one in Pennsylvania with seven deaths, and one occurred in West Virginia and caused six deaths.

In addition to the seven major explosions, with their accompanying 66 deaths in 1941, smaller or non-major explosions caused about 33 deaths, making an estimated total of 99 deaths from explosions and indicating a fatality rate of 0.150 per million man-hours of exposure to mining hazards underground. This rate was far better than that of the previous year, which was 0.489 per million man-hours.

In connection with gas and dust explosions it is interesting to observe that rock dust, used by many mines to prevent or limit coal-dust explosions, is now employed as a safety measure by bituminous mines that produce nearly 56 percent of the total production of bituminous coal in the United States, these figures being for the calendar year 1940 and also being the latest available. It is especially important that rock dust be used at mines that give off explosive gases, and on this point it may be stated that reports for 1940 showed that 45 percent of the country's output of bituminous coal came from mines that

Table I—Number and Causes of Fatal Accidents at Coal Mines in the United States in 1941

Cause	From Actual Reports Covering 11 Months January-November			As Estimated for the Entire Year		
	Bituminous	Pennsylvania Anthracite	Total	Bituminous	Pennsylvania Anthracite	Total
Underground:						
Falls of roof and coal.....	505	93	598	581	106	687
Haulage.....	170	24	194	191	28	224
Gas or dust explosions:						
Local.....	20	9	29	23	10	33
Major.....	58	...	58	66	...	66
Explosives.....	19	14	33	22	16	38
Electricity.....	35	4	39	41	5	46
Machinery.....	27	...	27	31	...	31
Shaft.....	7	2	9	8	2	10
Miscellaneous.....	14	11	25	16	13	29
Total underground.....	855	157	1,012	984	180	1,164
Stripping or open-cut.....	18	5	23	20	6	26
Surface.....	41	16	57	48	18	66
Grand total.....	914	178	1,092	1,052	204	1,256

Table II—Fatality Rates per Million Man-Hours of Exposure At All Coal Mines in the United States, 1931-41

Year	Underground ¹						Underground Open-pit, and Surface ²
	Falls of Roof and Coal	Haulage	Explosions	Explosives	Machinery	Electricity	
1931	1.280	0.354	0.131	0.060	0.033	0.097	0.134
1932	1.198	0.342	0.323	0.069	0.053	0.090	0.084
1933	0.979	0.329	0.068	0.058	0.042	0.090	0.090
1934	1.092	0.312	0.082	0.057	0.049	0.089	0.113
1935	1.106	0.380	0.082	0.083	0.058	0.075	0.122
1936	1.102	0.338	0.084	0.076	0.056	0.077	0.127
1937	1.089	0.413	0.174	0.068	0.057	0.084	0.093
1938	1.195	0.327	0.206	0.067	0.054	0.079	0.109
1939	1.129	0.331	0.084	0.058	0.069	0.093	0.080
1940	1.030	0.376	0.489	0.059	0.069	0.061	0.071
1941 ³	1.042	0.340	0.150	0.057	0.047	0.070	0.059

¹Rates computed on man-hours worked underground. ²Rates computed on total man-hours.
³Preliminary figures.

were rated as "gassy" by the mining departments of the States in which the mines were operated.

The chief cause of fatal accidents in 1941, as in previous years, was falls of roof and coal. This most prolific cause of fatalities showed a frequency rate estimated at 1.04 per million man-hours worked underground and accounted for more than half of all fatalities at all coal mines. The rate for the previous year was 1.03, thus indicating virtually no change in 1941.

Haulage accidents, which were exceeded in number of resulting deaths by accidents from gas and dust explosions in 1940, resumed their usual position of second place among the main causes of coal-mine fatalities in 1941. Preliminary reports indicate that 18 percent of all fatalities were due to haulage accidents, with a rate of 0.34 per million man-hours underground. This figure reflects a better safety record than that shown by the rate of 0.38 during the preceding year. It is hoped that the favorable comparison with 1940 will prove to be the beginning of sustained improvement in the haulage situation in coal mines, as the fatality rates from haulage accidents during the past decade have not shown the downward trend that might be wished for. Gains in pro-

ductivity per man-hour of labor, made possible by increasing mechanization of mining and loading operations, must be watched for their possible results in increasing losses from accidents.

Fatal accidents chargeable directly to explosives, and excluding gas and dust explosions, in which the original igniting agent may have been dynamite or powder, resulted in a death rate estimated at 0.057 in 1941. This rate was so similar to that for 1940 as to suggest that no material change occurred in the frequency of explosives accidents during 1941. Both years continued to show the progress that has been made in the prevention of explosives accidents during the last ten years.

Such progress is gratifying when considered in connection with the large quantity of explosives used by the coal-mining industry, consumption during 1941 amounting to approximately 162 million pounds of permissible explosives, other high explosives, and black blasting powder. Particularly pleasing, and perhaps accounting partly for the progress in safety, is the increasing proportion of the mining industry's explosives chosen from the "permissible" class of explosives, a class that comprises explosives that have been examined by

the Bureau of Mines and found to be safest for use in coal mines, particularly mines that have explosive gases or coal dust in dangerous quantities. The proportion of this class of explosives used by coal mines has increased from 32 percent in 1931 to approximately 43 percent in 1941.

Electricity, though widely used as a source of power in coal mining, causes relatively few deaths, the number estimated for 1941 amounting to less than 4 percent of the total number from all causes. The death rate was estimated at 0.070 per million man-hours worked underground, this rate being about the same as that of the previous year, which was 0.061.

Machinery accidents underground accounted for about 2½ percent of all fatalities in 1941 and resulted in a fatality rate of 0.047 per million man-hours worked. The previous year's rate was 0.069, thus indicating an improvement in 1941.

Miscellaneous causes of accidents underground and in shafts accounted for 39 fatalities during the past year, comprising about 3 percent of the total number from all causes, representing a rate of 0.059 per million man-hours. The record was better than that of the previous year, when the fatality rate was 0.071.

More Coal—Fewer Deaths

With an increase of more than 45 million tons of coal produced in 1941 over the production of the previous year, and with a reduction of about 132 in the number of men killed in 1941, it is apparent that increased output in the essential war commodity—coal—need not be accompanied by a rising death toll due to accidents in the mines. If this significant fact is borne in mind by management and men, the safety record of the coal mining industry in the future will be bright.

With the initiation on the first of this year of coal-mine inspections and investigations, under authority of the Federal Coal Mine Inspection Act, it is hoped that the willingness already exhibited by coal-mine operators and workers to accept the practical recommendations for safety made by the Bureau of Mines and their own initiative will result this year in the lowest number of deaths and injuries as well as the lowest rates of fatalities and injuries in the history of coal mining. By cooperation between management, labor, State departments of mining, the United States Bureau of Mines and all others concerned with safety, such a record can be achieved.

WHAT CAN BE DONE

To Provide Civilian Defense At and Around the Coal Mines of the Nation

FORTUNATELY, the coal mines of this country are all located well back of the coast lines except a few near the Pacific Ocean where the seam runs under the water, though the mines do not extend that far. Only a few of the Eastern mines, mostly those of the anthracite region, are subject to attack from offshore, but it must be remembered that unless some anti-aircraft batteries are provided specifically for the protection of a mine, its only defense can come from fighter planes which intercept the attackers and attempt to destroy or drive them away when or before they attack their quarry. However, it is always better to be safe than sorry, and a land base might give the enemy an opportunity to extend by several hundred miles its radius of operation.

Perhaps no one is better protected against air raids than the miner when at work, but his protection is limited to his own person and does not extend to his family and only to the time when he is in the mines. The time between the air-raid signal and the dropping of bombs may be only five or ten minutes, and in that short time only those actually engaged around yet outside the mine can reach it to use it as an air-raid shelter. All of them might walk underground in case of a drift or slope, but, in a shaft, only a few could be accommodated on the cage, even if the State rules for cage loading were disregarded in the emergency, as doubtless they would be. Moreover, hoisting or lowering during an air raid would be perilous in the extreme.

The public has become disposed to think of bombing as a more or less hit-or-miss affair, and so it is where there is anti-aircraft-battery protection, but at the mines there usually would be none and the bomber plane

would descend to such a level that accuracy would be assured. So, some have been disposed to declare that, when an air-raid warning is sounded, hoisting or lowering alike should cease. This would prevent miners from coming to the surface, where they probably could do little good and would be exposed to injury or death. Air raids on single plants away from urban centers usually are of such short duration that they probably would be over before the men could reach their homes.

During a raid, all power should be thrown off, and this would stop the fan unless kept running by a standby steam or gasoline unit. This standby should be started when the air-raid signal sounds. If the ventilation should cease, the men should be warned to come to a point or points underground at least 300 ft. from the shaft or portal, where they could be joined by all the bottom crew of the car landing and, in a drift or slope, by any other men coming from the surface.

To congregate at the foot of the

shaft might well be fatal and to stay at the face would be dangerous with ventilation suspended and with the risk that a fire might be started in the headframe by an incendiary bomb. Thus far in this war, the enemy has refrained from using poison gas, but should the invader do so, it would be necessary to short-circuit the air outby the group or groups of men, so that the phosgene, mustard or other gas would not be circulated among them.

Frequently, surveyors have cut a swath through the woods over the center line of the drift or slope, and this will indicate to the bomber a vital spot on which to drop his bomb, closing the exit to the surface and perhaps directly striking assembled miners, but the more usual danger is not from a direct but an indirect blow.

Peres (*Gas und Luftschutz* II, 1932) gives this formula for the penetration of bombs based on French and American experiments: $S = Ex \div Ay$ where S = depth of penetration in meters, E = impact energy of bomb in kilogram-meters, A = maximum cross-sectional area of bomb in square centimeters, x = a resistance coefficient depending on material penetrated and y = a coefficient depending on the shape of the bomb. The values of x are given in Table I.

Penetrations in feet as given by several authorities are listed in Table II. They are calculated for a 500-lb. bomb

Table I—Peres Values of x in Equation for Calculating Penetration

Ferro-Concrete	0.00067 to 0.00040
Concrete	0.00133 to 0.00083
Earth of average compactness	0.00500 to 0.00444
Earth loosely heaped	0.02000
x for all except poor quality concrete may be taken as 0.00083.	

Table II—Penetrations in Feet of 500-Lb. Bomb

	Metz Committee (Poncelet)	Petry	Vieser	Peres
Limestone	3.0	3.5	.....	.....
Ferro-Concrete	.....	2.1	1.5	1.7
Ordinary concrete	.....	.....	2.1	3.2
Stone masonry	.....	5.4	.....	.....
Brick masonry	10.0	9.3	4.3	.....
Sandy soil	20.0	17.0	10.0	.....
Soil with vegetation	.....	22.0	12.0	.....
Ground of average firmness	.....	.....	.....	17.0
Soft soil	.....	34.0	19.5	.....
Loose earth	25.0	.....	.....	26.0

having a section density ($M \div A$) of 5 lb. per square inch and a striking velocity of 820 ft. per second.

"Fifteen feet of first-class rock above an unlined chamber with a cross section $4 \times 2\frac{1}{2}$ ft." [the former being the height] "would give full structural protection against a heavy-case bomb weighing about 250 lb., whereas, against a similar bomb of about 500-lb. weight, about 20 ft. of rock cover would be required. As an excavation larger than that of this trial might weaken the rock above, a reasonably large factor of safety should be applied for such chamber." [British] Air Raid Precautions Handbook No. 5 — Structural Defense (1939).

Evidently, men will be none too safe in an 8-ft. gangway or heading with the average outcrop rock unless the cover is at least 50 ft. thick, and even then only if the bomb is not of exceptionally large size; they run to 3,000 lb. Therefore, it will be wise to have the men assemble off the main entry or slope and at a point where the cover is at least 50 ft., for penetration is not all that is feared. A breach of the roof would be perhaps as disastrous.

Mines as Air-Raid Shelters

The people living in a few houses near mine entrances may be able to make use of nearby abandoned or live mine workings, and there might be a few cases where it might conceivably be desirable to prepare these workings for the reception of such persons, even though they might not be afforded defense against direct hits. It would be necessary to be assured that the roof of the gangways is quite secure or, otherwise, a bomb falling at some distance would dislodge roof rock.

Freedom from methane, carbon dioxide and carbon monoxide also is essential. In the anthracite region, with its pitching beds, the air frequently returns through the goaf and is loaded with the first two of these gases and more rarely with the third, probably from undisclosed mine fires. Unless carefully supervised and well ventilated, such places would be death traps against which the public should be warned. In any event, such places could not serve the needs of a community. If an air raider should slip by, the warning would be short and time for travel would be restricted. If, on the other hand, he should be observed in plenty of time, he probably would be intercepted.

When the approach to the mine is

Table III—Shelter Protection Suggested

Material	Required Thickness in inches
Mild steel plate.....	1½
Brick wall *.....	13½
Plain concrete.....	15
Reinforced concrete †.....	12
Specially reinforced concrete ‡.....	10
Sand or earth revetment....	30
Gravel or stones between wood sheathing or corrugated iron.....	24

* Recent tests indicate that this figure may be somewhat reduced.

† Normal structural reinforcement.

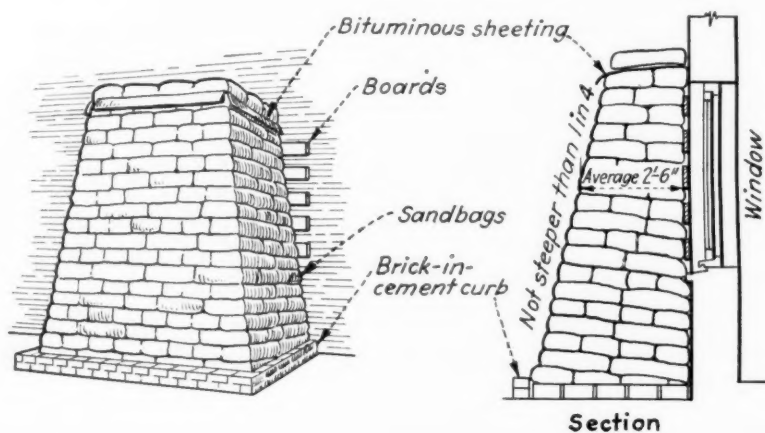
‡ Reinforced to resist local stresses in diagonal tension.

by a shaft, shelter will have to be provided for the surface workers. As a rule, there will be no trouble about this, but if the bomber arrives as the men are going to or leaving work—and he might choose such a time—it would be difficult to provide shelter for all the men in such an eventuality, especially seeing that no more than 50 men should be sheltered at one spot. The men cannot be protected against a direct hit, and direct hits may be even probable if there is no protection from air-raid guns. Table III gives the thickness of various materials required for protection against fragments of a 500-lb. bomb at a distance of 50 ft., based on tests made in England.

The weakness in existing buildings is due to the presence of windows which the blast will fracture, propelling fragments of glass. To prevent this the windows may be blocked with brickwork or a frame may be built of wood supporting a lining of corrugated iron and that in turn inclosing gravel, sand or earth; or again planking may be set on either edge of the wall and securely bolted in place with space between filled with gravel.

Another plan is to use a sand-bag barricade on the outside of the shelter with a batter of 1 in 4 on all exposed faces with boards across the window opening, and roofing felt near the top of the barricade to keep moisture out, all mounted on a low brick wall at the base to keep the sand bags off the ground. This, however, is not a permanent protection, for the bags will rot and frost will burst them. One may build a tile stopping and cover it with a bituminous sheet for weather protection, binding the tile together with clips. The safest place in which persons in any room can stand is in an angle away from the windows. Every shelter should have two entrances so that if one becomes blocked the other still will be available (Protection Construction Series No. 1, U.S.O.C.D., "Glass and Glass Substitutes").

One of the unfortunate characteristics of mines that give the enemy at night an idea of direction and location, whether on his way to destroy mines or to damage other objectives, is the presence of coke ovens, burning rock piles and even burning coal stocks. Blackouts for these are difficult to arrange. Byproduct coke ovens are a problem of steel companies and gas-manufacturing companies rather than of coal-mining concerns, though the management of the byproduct ovens of some steel companies may be sometimes perhaps under the control of the coal-mine management, but many coal companies have beehive ovens that have trunnel holes in their tops which radiate light, and doors not completely bricked up to the top of the arch which also emit light, though they are closed and luted with clay



Sandbag barricade for window. Bags three-quarters filled, with necks turned under bag and laid in alternate courses of headers and stretchers, each layer inclined inward. Brick in curb should have open vertical joints for drainage and rest on loose bricks or stone, concrete blocks, beams, fence posts, etc., for drainage.

as completely as possible as soon as coking commences, and that is when the light from this source is most vivid.

Arrangements could be made to direct the gas from the trunnels or from a point near the top of the oven to a big pipe leading to a chimney at the far end. Some of the beehive ovens built before such ovens became antiquated had a conduit of this kind which made it possible to use the waste heat for steam purposes, but the recently reconstructed ovens, being expected to remain in operation only "for the duration," have no such provision, though it might be added at reasonable cost, this time for an entirely different reason. Otherwise, the only way to prevent glare would be with a smoke blackout, which might be ineffective if the wind tended to carry the smoke away from the ovens as soon as formed.

Most brilliant of all illuminations is from pushing or pulling the coke from ovens onto the wharf. In case of a raid, the coke could be quenched promptly, however. Arrangements could be made for locating the hose so that personal attention during a raid would not be necessary; with the pulled oven, however, the coke does not come out so rapidly and light

would still come from the coke within the oven.

Fire in burning rock piles cannot be extinguished readily. Water often increases the blaze rather than deadens it. In Great Britain inert dirt has been thrown on the "waste bings," as they are termed, so as to suffocate the fire. It would be easy to cover the rock in this way, but the material must be free of blossom coal or of the oil shales so frequent in Pennsylvania. In fact, many of the fires are entirely of rock, but that rock is oily, and oil catches fire even more readily than coal. Dirt would not disturb the pile, whereas water makes it slide, often endangering dwellings, interfering with further dumping, and promoting more rapid combustion.

Stockpiles tend to fire, and they should not be made too high. Many coals will fire if piled more than 10 ft. deep, especially in the summer. Skirting the pile with a close board fence 3 or 4 ft. high will aid in preventing combustion, according to Carl Scholz, consulting engineer, Charleston, W. Va. Another preventive measure is to raise the coal by increments and scrape it with a scraper pushed or drawn by a tractor. This will serve with rock piles also.

At the Buckskin mine, in Indiana, a shallow rock-and-bone pile repeatedly

fired when it was filled from mine cars running on a track shifted over the surface of the pile. When the material was transported by a small one-ton Ford truck, that truck so consolidated the pile that no more fires occurred. Of course, the rolling of a pile of run-of-mine or sized coal would be out of the question, as it would grind the coal to slack.

Among the more important duties of a mine manager and superintendent is to guard against sabotage and the accumulation of explosive for some nefarious purpose. The U. S. Bureau of Mines has announced regulations to control explosives and their ingredients during the war, the regulations being based on the recent act of Congress prohibiting the manufacture, distribution, storage, use or possession of explosives or ingredients of explosions unless a license has been obtained from the Bureau. This covers everything including liquid oxygen.

Water supplies, water mains and electric lines should be guarded and owners of such facilities should be authorized to engage such guards and powers be given them as officers of the law. Few indeed of the men are disloyal, but one man can do enough harm to overbalance the good work of a hundred men.

DEFENSE AIDED

By Research Projects

How Science Backs Our National Endeavor

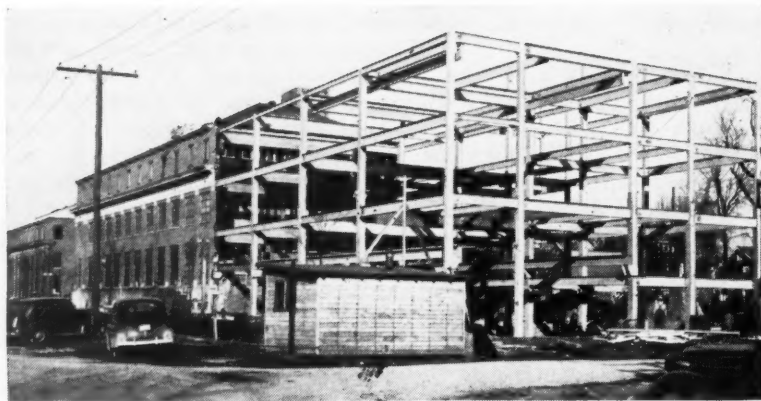
DURING 1941 many of the research projects gave promise of aiding in defense work, though more, of course, relate to safety and economy, which are always timely, and others are fundamental determinations that time alone will turn into defense material if we should be unfortunate enough to be involved in war after the determinations have been made and their connotations recognized. The flexibility

of research institutions that enables them to tackle all the problems that vex us is well illustrated. Not alone in Axis countries does science aid in the war.

On the other hand, defense activity during the past year apparently had little unfavorable effect on coal research, while it brought into being some new researches and modified others. For a while it seemed likely that

the uncertainties of the situation, the drain of graduates to the services and industry, and the time-consuming industrial training activities of many of the colleges and universities might cause a reduction in the importance and number of research projects.

Among those projects that have been modified by war and the prospect of war have been those relating to the heating of temporary houses and those



Battelle adds space for pilot plants.

arising from the difficulty in getting oil, gas or materials. In the anthracite domestic consumption field, new models were introduced, but they were mostly simplifications rather than elaborations of equipment. Few new manufacturers entered the heating equipment field, so the Anthracite Industries Laboratory had little occasion for tests of such equipment.

However, some simplified parlor heaters of radiant type have been introduced which have an improved principle of combustion, one that permits long intervals between firings and gives generally satisfactory performance. A companion piece recently announced employs the principle embodied in a service water heater.

Anthracite War Housing

To meet defense housing requirements, the Anthracite Industries Laboratory, with the U. S. Housing Authority, developed a complete heating plant in which cook stove, water-back and house-heating boiler are combined in an attractive enameled jacket. Several defense housing projects have already included this unit in their design, and because of its appearance, utility and material saving of space, the present demand for it exceeds existing manufacturing facilities. More manufacturers, therefore, are being sought.

The war has caused thousands of homes to be constructed of a type and small size heretofore infrequently built. This, in turn, has been met by development of new types of extremely compact warm-air furnaces. In the East most of these are being fired with coal on grates, although oil models also are available. Forced circulation is employed as controlled by simple units generally of the diaphragm type. Several manufacturers are offering these furnaces, and their number is increasing rapidly.

Because of the low internal resistance of many of the new space heaters and warm-air furnaces, a new demand has been created for the barometric type of damper, which now is used principally for reducing stack temperature to a fixed maximum. Development of removable houses has led to a search for an inexpensive dismantlable chimney. At least one manufacturer is offering a vitreous enameled stack for this purpose. Around it, conventional insulation is placed in such manner as to protect surrounding structures and to fit this chimney for all purposes where stack temperatures are not abnormally high.

Research includes the development of grates that can readily replace oil burners in all types of furnaces, should transportation difficulties create an oil famine in the Northeastern States. Progress on this development has reached a final production stage.

Research in the stoker field includes development of means for photographing active fires in such a manner that hours of performance may be viewed in a couple of minutes. By this means, all manner of changes in the fuel bed may be observed and more fruitfully studied. This permits combustion difficulties to be diagnosed quickly and leads to improvements in operation. Work will be extended to other fields of combustion.

Other work has been done to adapt coal to the war's changing conditions, as, for example, the erection of Army camps, defense housing, and temporary buildings. For similar reasons, the Bureau of Standards at Washington has been actively experimenting with coal-fired heating boilers and furnaces and also with prefabricated as well as conventional brick chimneys.

In a report of his findings as to the suitability of anthracite for metallurgical fuel presented before the Eastern States Blast Furnace and Coke

Oven Association, H. J. Rose, senior industrial fellow of the Mellon Institute, said that at some collieries, all the sizes contain only 0.6 percent sulphur and at some others only 0.5 percent of sulphur, though some have more than 1 percent. Plenty of low-sulphur anthracite, however, is available for such uses. Most blast-furnace men would be intrigued with the prospect that they can get fuel with only 0.5 to 0.7 percent of sulphur, for about 90 percent of the sulphur in the blast-furnace burden enters with the fuel.

Where it is found necessary to increase slag volume to produce iron which meets sulphur specifications, there would be a substantial saving in using low-sulphur coal. In general, the ash content of the large sizes of Pennsylvania anthracite is about the same as, or a little lower than, the ash of coke made from Pennsylvania coals. Egg anthracite from 41 breakers showed an average ash content of 9.2 percent. Phosphorus content, though not often determined, usually is satisfactory or good. Six phosphorus percentages based on ash, if recalculated on the basis of 9 percent of the latter impurity in the coal, would show that the anthracite from which it is derived would contain a little less than 0.01 percent of phosphorus pentoxide.

High Alumina Helpful

Dr. Rose quotes the Bureau of Mines as saying that many furnace operators desire ores which will add enough alumina to their furnace burdens to produce slag with 14 percent alumina rather than 10 to 12 percent, for then they can better control their sulphur, as alumina tends to increase the temperature at which slag reaches the hearth and also retards the descent of iron globules through the slag, both of which conditions promote desulphurization.

Anthracite ash, according to Dr. Rose, has an average of 34 percent alumina. Although anthracite ash fuses at a high temperature, it fluxes readily with limestone or dolomite, as shown in the manufacture of mineral wool from such ash. Reactivity, heat yield, freedom from tar, high hydrogen content, shatter strength, resistance to thermal shock and freedom from softening when heated under load are other favorable characteristics.

Anthracite men are confident that the value of anthracite for use in cupolas for melting iron is no longer matter for doubt. To speak in metaphor, iron and anthracite are agreed to mate and

have merely called in the Pennsylvania State College with its thermocouples and other gadgets to legalize the union already consummated. There is nothing, the anthracite industry believes, to prevent anthracite from again resuming its place as a metallurgical fuel except a few fables about porosity such as kept byproduct coke out of some blast furnaces for almost a decade. With the passing of such prejudices, there is nothing to prevent anthracite from again resuming its place as a metallurgical fuel and from thus relieving the burden of the present coke shortage.

Thus, in the belief of anthracite men, would be redressed in World War No. 2 the losses sustained by the anthracite industry in World War No. 1, when the West was bluntly told to learn how to burn the fuels produced in nearby centers, and soft coal, coke and lignite permanently displaced anthracite in the many domestic furnaces of that region.

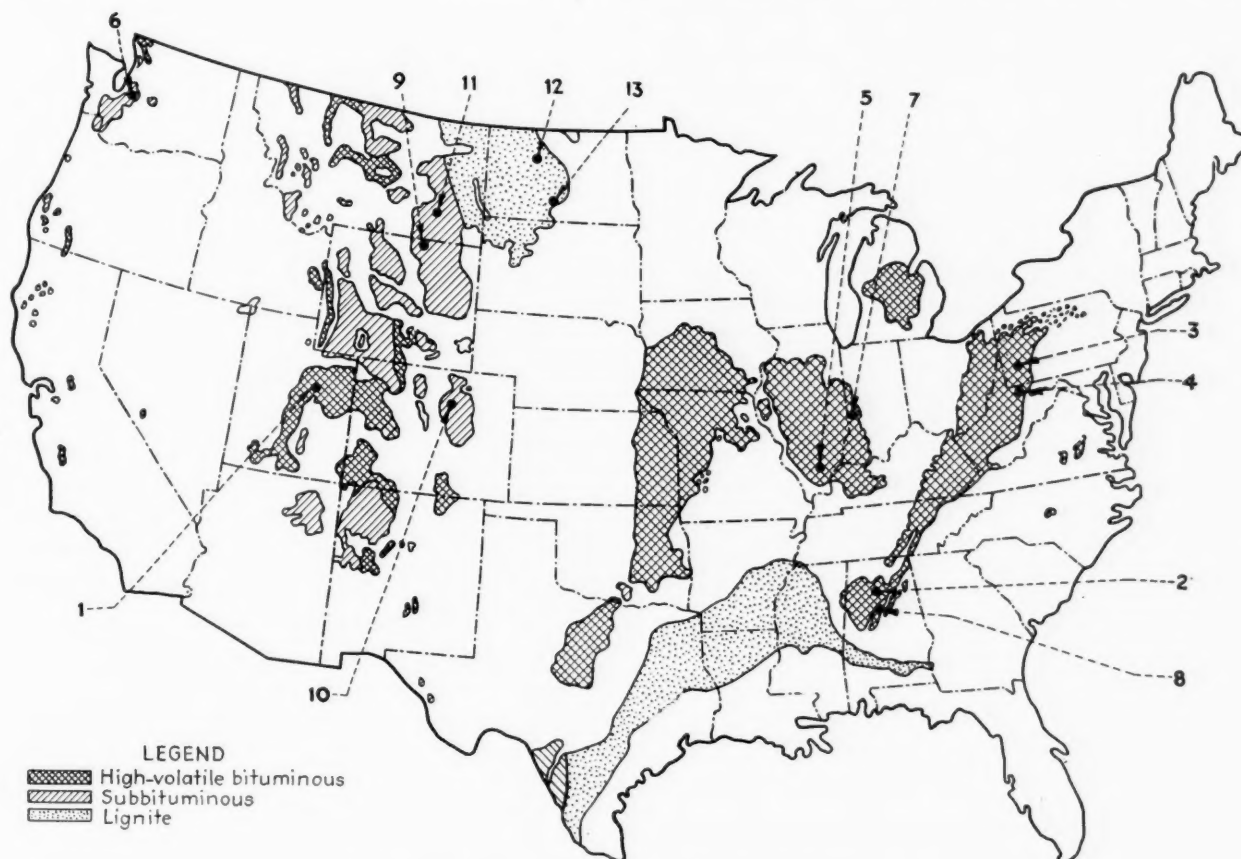
Studies of the U. S. Bureau of Mines into dust-allaying with the aid of wetting agents combined with actual tests made by the coal industry prove that dust can be allayed with less water than when such agents are used. This will reduce, in some cases, the perplexing burden of limited transportation facilities, enable the coal to give more heat per delivered ton, and decrease frosting of coal. It also will save water (often none too plentiful) and reduce blinding on the screens. In other cases, it will incline the operator toward the more general use of water with increased safety and health in operation.

With the shortage of railroad cars and locomotives, the large-scale tests of the Bureau with the University of Dakota into the possibility of drying small coal by the Fleissner steaming process with economy and profit takes on renewed importance. They show that the fine coal can be desiccated much more rapidly and cheaply than

the coarse material. The decreased freight, say the investigators, should pay for the dehydration. Studies also in storage of subbituminous and lignitic coals showed that tightly closed bins, with an even temperature and one as low as possible, will enable the fuel to retain its moisture and so prevent slacking, giving this fuel a wider use in the market tributary to it and saving transportation thereby.

Among other examples of defense projects may be mentioned: (a) One by H. C. Porter to increase the quantity of low-volatile coal usable in coke production with high coke yields; (b) analyses of Washington coals by the Bureau of Mines made specifically to find fuels for use on the Pacific Northwest, and (c) studies of combustion problems arising from the shifting use of coals due to demands of defense industries, a Bureau of Mines undertaking.

Elimination of smoke today is a subject of major interest, now that it



How much gasoline will coal produce on hydrogenation?

Yields From Coals Tested in U. S. Bureau of Mines Hydrogenation Plant

Number	Bed or Mine	Nearby City	Gallons of Gasoline Per Ton of Coal	Number	Bed or Mine	Nearby City	Gallons of Gasoline Per Ton of Coal
(1)	Lower Sunnyside	Price, Utah	136	(8)	Mary Lee	Birmingham, Ala.	105
(2)	Black Creek	Birmingham, Ala.	134	(9)	Monarch	Sheridan, Wyo.	100
(3)	Pittsburgh	Pittsburgh, Pa.	130	(10)	Puritan Mine	Greely, Colo.	91
(4)	Upper Freeport	Morgantown, W. Va.	126	(11)	Rosebud	Forsythe, Mont.	81
(5)	Illinois No. 6	West Frankfort, Ill.	122	(12)	Coteau	Minot, N. D.	65
(6)	McKay	Seattle, Wash.	120	(13)	Knife River Mine	Bismarck, N. D.	63
(7)	Indiana No. 4	Terre Haute, Ind.	112				

is realized that the many domestic users in aggregate make much more smoke than a few industrial chimneys. Battelle Memorial Institute has an investigation in progress into the smokeless combustion of bituminous coals in a magazine space heater of new design. Its inquiry surveys new principles by which formation of smoke may be prevented in the operation of space heaters, cooking ranges and service water heaters. It also is investigating the possible adoption of the Humphrey internal-combustion pump for operation with pulverized coal. This pump uses a moving water column as a piston and thus elevates water for subsequent passage through turbines.

Battelle's study on the removal of pyrite from coal by froth flotation has laid stress on the effect of various pyrite depressants in a flotation circuit that contains a relatively large quantity of clay in slime suspension. Study has been devoted to the formation of a brittle froth capable of floating coal without entraining fine pyrite. The institute's work with use of heavy-liquid concentration is pursued to ob-

tain a coal product so ultra-clean that it can be used for conversion to electrode carbon.

Tests made by the Coal Research Laboratory, Bituminous Coal Research and the Pittsburgh Coal Co. at the Hell Gate generating station upset the beliefs of combustion engineers in the structure of underfeed stoker beds. Accordingly, improvements were conceived for such equipment and a 17-claim patent has been allowed.

After two years of research and development into low-temperature carbonization, G. W. Carter, department of mechanical engineering, University of Utah, as chief engineer for the Coal-Logs Co., Inc., has developed a new system of carbonization and a commercial plant, the first to be constructed in Utah, with a capacity of from 30 to 40 tons of raw coal per day of 24 hours, is being erected in Salt Lake City. This plant will produce smokeless fuel in cylinders of various lengths and of 3½-in. diameter suitable for use in all types of hand-fired equipment including fireplaces. Non-coking coal will be used and no binder will be needed.

When nylon, which is a coal product, is ground and melted while under the pressure of an inert gas like carbon dioxide or nitrogen, it is converted into a material known as synthetic leather. Fine bubbles are entrapped which form tiny cells in the molten nylon. This then is extruded from a slit in sheets. However, it can be molded into slabs. By use of higher gas pressures, the size of the cells can be increased so as to produce a synthetic sponge. Materials can be made for soundproofing, for padding seat cushions, for making packing material, wadding or even cork.

At the plant of the Lehigh Briquetting Co., Dickinson, N. D., after several years of experimentation, tar recovery has been considerably increased. The tar is now extracted from the gas, partly by Cottrell precipitators and partly by a scrubber operated with circulating water. Some experimental work was done in 1941 in extracting tar acids from the oils for use in the manufacture of plastics, and now in 1942 it is expected that recovery of these acids will be undertaken.

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* Items starred indicate that the work on such projects was in progress during 1941 and was still continuing at the close of that year.

† Items with dagger were concluded in that year.

° Items marked with small circle indicate that an article has appeared describing some of the results of the investigation.

‡ Items marked with a double dagger indicate that a report probably will be made in 1942 or in the year therein indicated. Dates in parentheses which accompany references to article give year of their appearance.

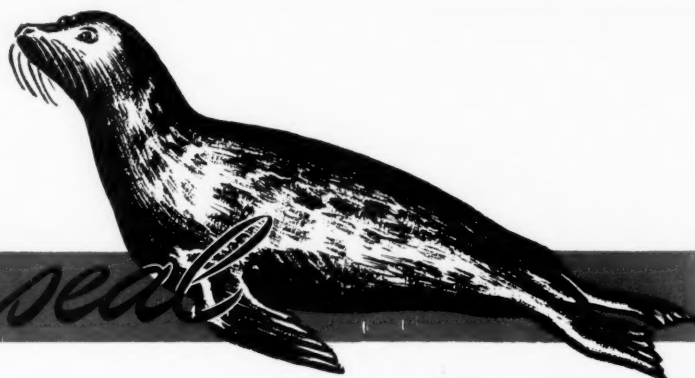
• Items thus marked are projects apparently not hitherto listed. Project names change and some projects narrow or expand; thus this indication is merely to call attention to items thus signalized.

Figures shown in parentheses against name of project indicate year in which project was started. Those marked (1942) are projected to start in that year. Absence of notation indicates informant failed to declare year of initiation or status of project. Notations following name of scientific body making the research and of the company or institution sponsoring it refer to papers or reports in which these investigations were, in whole or in part, communicated. Certain of the items in the listings might with almost equal propriety be grouped under some other heading. Where the project is of multiple interest or where it cannot be listed under any one subject, it is placed under "Surveys" or "Miscellaneous." Groupings have been changed from year to year as interest in certain lines of research have risen or fallen.

Abbreviations. Agri., Agriculture; A.G.A., American Gas Association; Am. Assn. for Adv. of Sci., American Association for Advancement of Science; A.I.M.E., American Institute of Mining and Metallurgical Engineers; Anal. Ed., Analytical Edition; Anth., Anthracite; Anth. Ind. Lab., Anthracite Industries Laboratory; A.S.M.E., American Society of Mechanical Engineers; A.S.T.M., American Society for Testing Materials; Battelle Mem. Inst., Battelle Memorial Institute; Bit. Coal Res., Bituminous Coal Research; Carnegie Tech., Carnegie Institute of Technology; Central Pa. Coal Prod. Assn., Central Pennsylvania Coal Producers Association; Chem., chemistry; Circ., circular; Com., committee; Comm. Test. & Eng. Co., Commercial Testing & Engineering Co.; Conf., conference; Econ., economic; Fdn., foundation; *Fuel*, *Fuel in Science and Practice*; Geol., geology; G.S., Geological Survey; I. C., Information Circular; *I. E. C.*, *Industrial and Engineering Chemistry*; Inst., institute; *Iron & Steel Eng.*, *Iron and Steel Engineering*; J., journal; *J. Am. Chem. Soc.*, *Journal American Chemical Society*; *Mech. Eng.*, *Mechanical Engineering*; Mellon Inst., Mellon Institute of Industrial Research; Min. Ind. Exp. Sta., Mineral Industries Experimental Station; Nat. Bur. of Stand., National Bureau of Standards; Penn State, Pennsylvania State College; Res., research; R.I., Report of Investigations; Surv., survey; T. P., Technical Publication or Paper; U.S.B.M., United States Bureau of Mines; U.S.H.A., United States Housing Authority; Univ., university; W. Pa. Coal Oper. Assn., Western Pennsylvania Coal Operators' Association.



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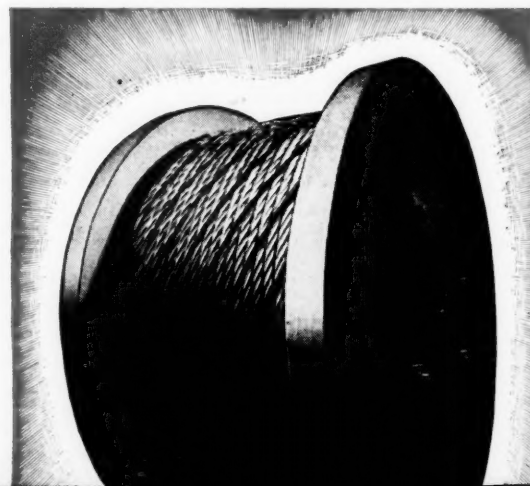
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BETHLEHEM STEEL COMPANY

WHAT'S NEW IN OPERATING IDEAS

Three-Hopper Sand Dryer Built Over Drillhole to Mine

Pointing out that the job is to dry 25 tons of sand per day and that with two stoves the problem often became acute in freezing weather, Sidney B. Sage, mining engineer, Union Colliery Co., Dowell, Ill., submits the following account of the steps taken to meet the problem.

"We handle the sand just once from our storage pile until it gets into the mine. This is done with a locomotive crane with a 1-cu.yd. clamshell bucket. We converted this crane from steam power to electric by installing a d.c. motor and V-belt drive to the crankshaft. The sand is put into the dryer, which consists of three hoppers. The upper hopper has a capacity of about 30 tons of wet sand. This hopper has angle-iron baffles across the bottom to keep the weight off the hopper and steam coils below.

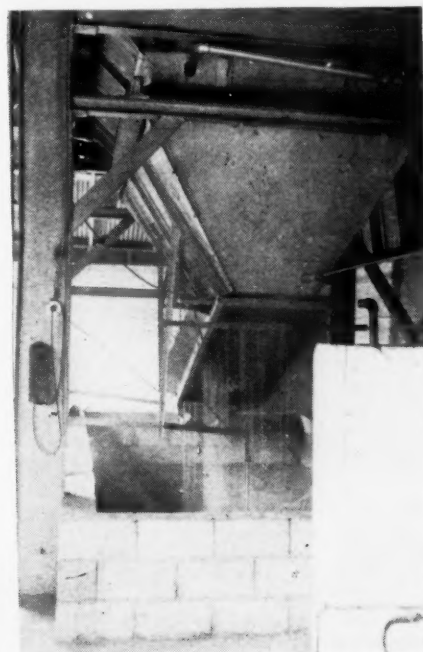
"The middle hopper consists of 500 ft. of 2-in. double-strength pipe made into one rectangular coil by welding the corners. The pipe sections are spaced $\frac{1}{2}$ in. apart for the sand to filter through. The sheet-metal container on the outside of these coils is spaced 3 in. away to permit air circulation and provide an opportunity for moisture to escape. The baffle at the bottom of this hopper is made so that the sand has to come in contact

with the coils before falling through. This baffle is removable so that the hopper can be cleaned out from below. When the sand leaves this hopper it falls on a wire screen with a 30-deg. pitch equipped with a vibrator.

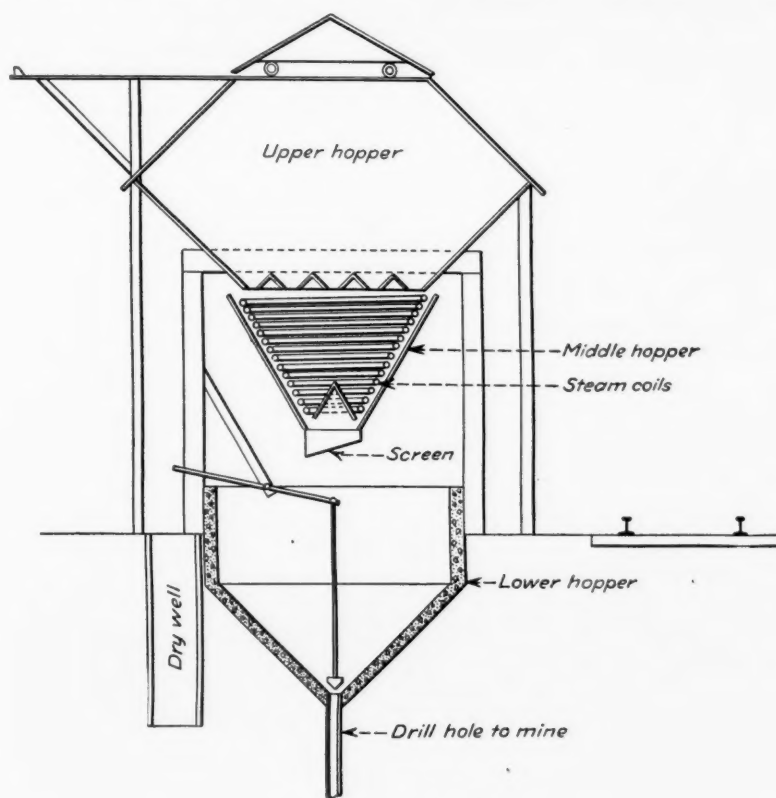
"The lower hopper is for dry-sand storage. It is constructed of concrete and is mostly below ground level. A 4-in. drillhole runs from the bottom of this hopper 220 ft. into the mine. The sand goes down this hole and is loaded into sand cars for distribution to the various parts of the mine. At the top of the drillhole is a needle valve which is kept closed except when taking sand below. The



Sand-drying plant and locomotive crane.



Showing screen under the middle, or drying hopper, with sand falling into lower concrete hopper.



Details of sand-drying plant.

pipe is cleaned of sand after every shift to keep the hole from clogging.

"We dug a dry well at one side of the lower hopper, which extends below the top of the drillhole casing to catch any surface water which might leak through to the hopper or casing. On top of the upper hopper is a sliding door which rolls off to one side when the hopper is being filled with sand.

"The coils are heated by steam from the boiler room. This steam passes through a pressure-reducing valve and is regulated from 2 to 12 lb., depending upon the weather and the condition of the moisture in the sand. We have a standby boiler salvaged from an old locomotive crane in the sand house. This is used only in severe cold weather when steam from the boiler room is needed elsewhere."

Worn Coal-Drill Augers Renewed By Electrode on Flights

Worn flights on coal-drill augers are built up easily and rapidly at the central machine shops of the Old Ben Coal Corporation, West Frankfort, Ill., by a method developed by Frank Eubanks, maintenance engineer. Building them up naturally means that augers are kept off the scrap pile.

The first step is to grind off the spiral edge of the flights until it presents a clean surface for welding. This also provides an opportunity for eliminating any humps. But, since the wear usually is quite even, there



Showing welder at work on an auger.



Electrode attached to the flights ready for the final arc-weld beads.

normally is not very much grinding needed.

A $\frac{1}{8}$ -in.-diameter 36-in.-long bare steel electrode then is spot welded to one end of the spiral with a gas torch. Using the torch, the electrode then is heated a cherry red and is bent to follow the spiral edge of the flights. In this process it is spot welded on every few inches. Other rods are added until the end of the flights are reached. This increases the diameter of the auger by twice the diameter of the rod.

The final step is to stand the auger on one end in a socket where it may be rotated easily. Then, with the electric arc, a bead is run down each side of the spot-welded electrode, joining it solidly to the flights.

Preheating for Expansion Aids in Welding

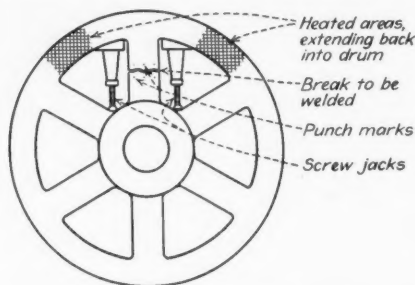
"The procedure that was followed in bronze welding a cast-iron mine-hoist drum shows how local preheating can be of assistance in certain types of welding operations where controlled expansion of the part will result in a better weld," states a recent issue of *Oxy-Acetylene Tips*. The break was in one of the spokes, which are in tension during part of the operating cycle. "Therefore, a welding procedure that would minimize these stresses and strengthen the weld was needed.

"To accomplish this, it was decided to open up the crack by preheating selected areas of the drum's surface, thus causing them to expand and draw apart the two sections of the broken spoke, and then fill in the enlarged gap with weld metal, so that, when the casting cooled and contracted, the weld would be slightly in compression. Otherwise, the two sections of the broken spoke would be drawn slightly together dur-

ing welding, due to the heat, and on cooling would contract, placing the weld in tension.

"The accompanying sketch shows how the repair was made. After the edges of the break had been chipped to clean metal, and punch marks had been made on either side to provide a means of checking expansion, the areas indicated by shading in the sketch on the drum flange and behind them, extending several feet into the drum body, were heated with the welding blow-pipe. As these areas expanded, the outer section of the broken spoke was drawn outward, assisted by the action of the screw jacks, as shown in the sketch.

"When the opening had been increased about 0.05 in. it was bronze-welded. The figure of 0.05 was decided upon by referring to a metals handbook, which gave 0.042 in. as the estimated expansion of a 1-ft. length of cast iron when heated to about 500 deg. F. After welding, the jacks were removed and the preheated sections allowed to cool and compress the weld area. As the weld cooled it was peened with a hammer.



Showing how broken spoke was repaired. Shading indicates where preheating was done to open up crack in spoke.

"Standard bronze-welding technique, employing a slightly oxidizing flame, Oxweld No. 25 M. bronze rod and Oxweld Brazo flux, were used. The entire operation was carried on without removing the drum from its operating position."

Shed Keeps Coal Cars Dry And Expedites Preparation

The West Kentucky Coal Co. operates a central preparation plant at Sturgis, Ky., serving three mines over its own railroad, which delivers 3-in. screenings to the re-screening plant to be graded over shaking



Keeping it dry improves preparation.

For the Duration

More—much more—of all kinds of fighting tools is the watchword from now on until final victory is achieved. Coal will play a vital part in the manufacture of these tools, and the industry now tackles the big problem of supplying the tonnage. To do it, everything must click. Operating, electrical, mechanical and safety ideas therefore take on even greater importance. We will pass them on if you will send them in. So if you have one, now is the time. Write it up, inclose a sketch or photograph if it will help to make it clearer, and put it in the mail. Your country will benefit, and for each acceptable idea Coal Age will pay you \$5 or more on publication.

screens and then moves the prepared coal to outside rail and river connections.

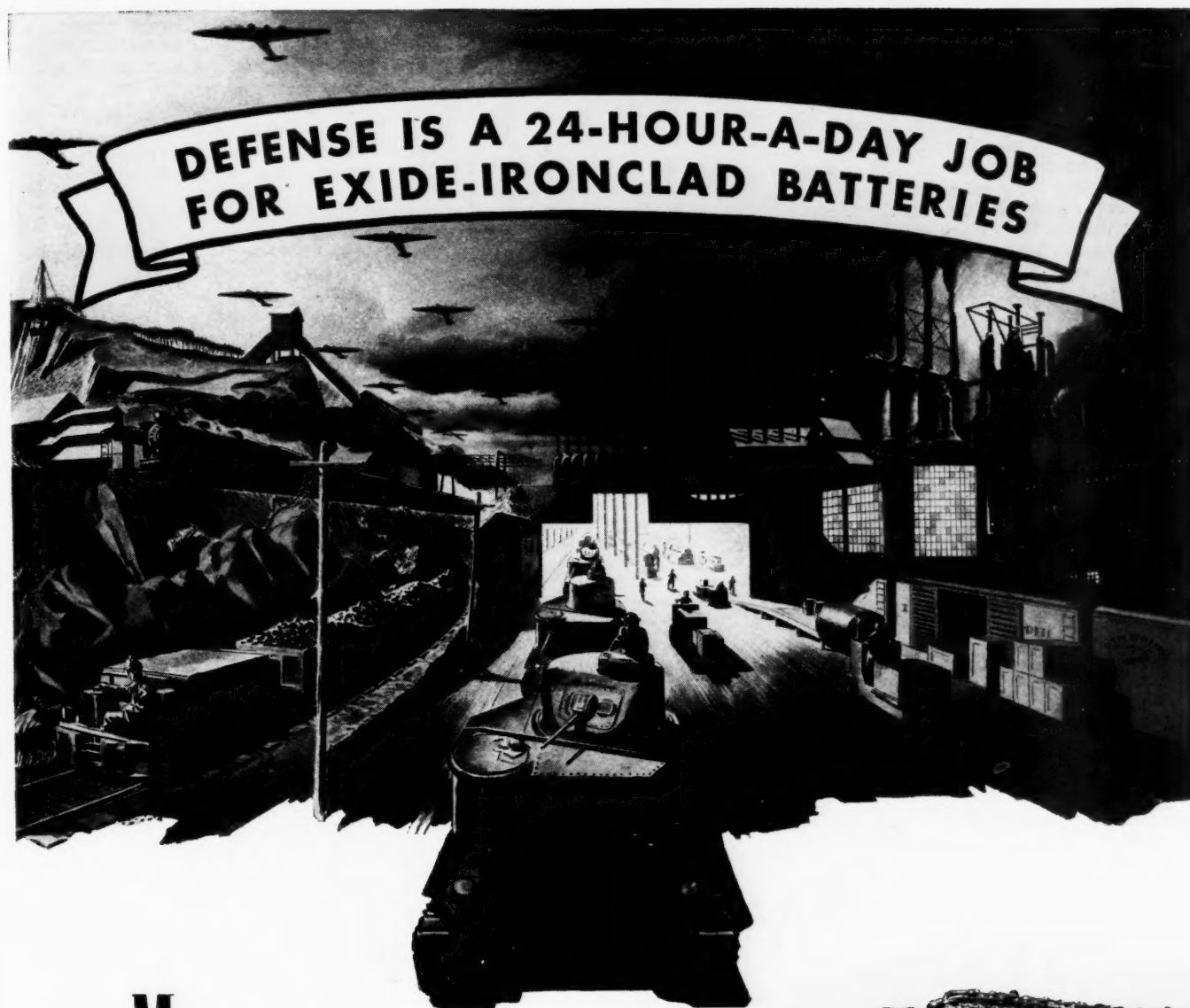
For protecting raw coal from rain, sleet and snow, so the fines will screen out completely, the train shed shown in the illustration was built. This unusual protection is a great help in making a complete separation of the fines—a distinct marketing advantage.

Starting With Right Pipe Size Keeps Pumping Efficient

"New mining plants too often install temporary pumping equipment, including pipe lines," writes E. A. Smith, civil and mining engineer, Prestonsburg, Ky. "Pipe lines become covered with tons of gob in many cases. To replace such small lines with larger ones would entail the extra cost of moving this gob. So the big mistake is made of extending the too-small lines, which are expected to take care of more and more water as the development of the mine progresses. Not many men realize that it is possible to mine several times more water than coal, but this often is the case.

"By consulting 'Useful Reference Tables' in *Coal-Mining Catalogs* (McGraw-Hill Publishing Co.), the writer arrived at the following comparisons:

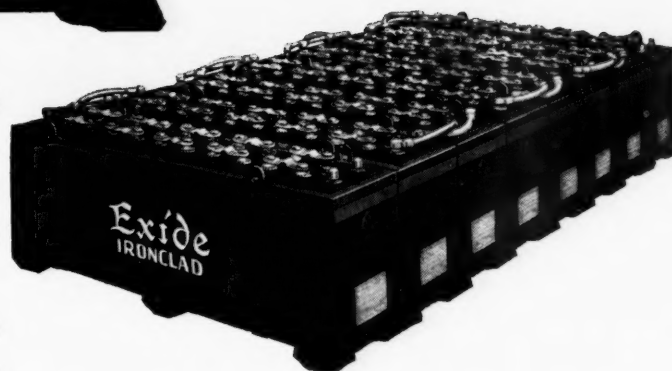
"1. To use a 3-in. pipe line 1,000 ft. long



MORE TONS of coal, more tons of minerals... by the thousands... are needed. They must be mined and hauled *faster* to keep defense furnaces roaring and defense machinery moving.

So Exide-Ironclad Batteries are on the job night and day, powering the storage battery locomotives and shuttle cars in mines, quarries and tunnels.

Exide-Ironclads have been specified for this important 24-hour-a-day defense job because they supply the surging power needed to handle today's heavier loads... and they deliver



this power at a consistently high voltage for faster running speeds.

Best of all, Exide-Ironclad Batteries are so easy to maintain and so *dependable* that they are helping to prevent breakdowns and delays... they're doing their part to keep America rolling!

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

for a 50-g.p.m. discharge, the pressure would be 3.5 lb. per square inch against the pump.

"2. To use a 3-in. pipe line 2,000 ft. long for a 450-g.p.m. discharge, the pressure would be 450 lb. per square inch against the pump.

"These comparisons show that increasing the length of 3-in. pipe from 1,000 to 2,000 ft. and raising the discharge from 50 to 450 g.p.m. increases the friction head from 3.5 to 500 lb. per square inch, or 143 times. As a result the cost for current, or propelling power, should be multiplied 143 times, equivalent to a 14,300-percent penalty in the form of added pumping cost. If an 8-in. pipe had been installed, the friction head would have been only about 4 lb. per square inch with the 2,000-ft. line, against a few hundredths with the 1,000-ft. line. It can be seen, therefore, that proper attention to the initial investment can materially reduce long-time operating cost."

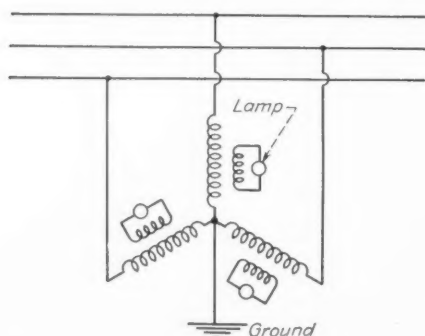
Water Kept Out of Motors By Vacuum Cleaner

Years ago when mine drainage, in the light of present-day standards, was inadequate, water frequently entered the motors of electric locomotives and caused shorts and grounds. Now, with dryer haulways, keeping water out of motors is a problem which comes up only in emergencies, such as those resulting from sudden influxes of water or failure of pumping equipment. How to keep water out of a motor case if the emergency does arise is told by S. J. Kester, of the company's Denver office, in a recent issue of the *General Electric Review*.

The trick was accomplished on a tunnel job by adding a vacuum cleaner to the locomotive equipment and connecting it by a 1-in. hose to the motor cases. The positive internal pressure prevented the entrance of water.

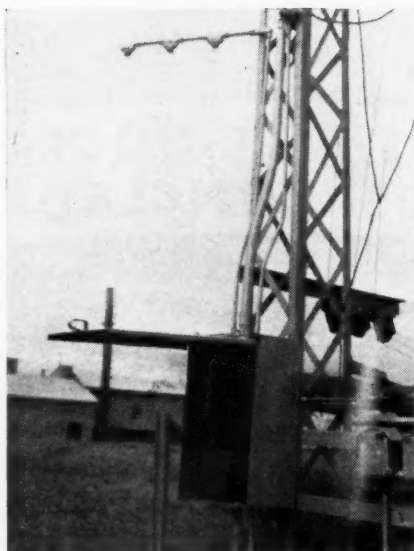
Signaling Ground Detector Is Simply Connected

Safety, low maintenance and avoidance of delays call for immediate detection and clearing of grounds on 2,300-volt distribution systems serving motors and transformers. The accompanying diagram shows the connections



The lamps are powered individually from potential transformers.

of potential transformers and ground-indicating lamps used at a Southern mine where the secondaries of power transformers are connected delta in accordance with common practice. Potential transformer protective



Box with door open houses three potential transformers powering lamps on bracket above.

box and lamp mounting are shown in a second illustration.

Assuming that the line voltage is 2,300 and the system is free of grounds, each lamp is lighted at 64 volts. But if a conductor becomes grounded, the lamp powered by the potential transformer connected to that conductor dims or goes out, depending upon the resistance of the ground. If the ground is a bad one, the other two potential transformers get full voltage and their lamps brighten to the full output at 110 volts.

Three-in-One Utility Stations Serve Farmington Stripper

This odd looking land vehicle was built for three-fold duty at the strip mine of Midland Electric Coal Corporation, Farmington, Ill. Two of these sleds are used, one trailing the loading shovel and the other (shown here) paralleling it on the high wall.

Welded of hefty steel, they are sturdy enough to take the weather and abuse that such equipment is subject to around a strip mine. Each is a three-way utility: a peg to hang the trailing cable on, a safety ladder and a field telephone booth.

Hooked on behind the loading shovel, one of these devices drags along the power cable, which is looped about the semicircular turret and trails about 15 ft. behind. The rope,



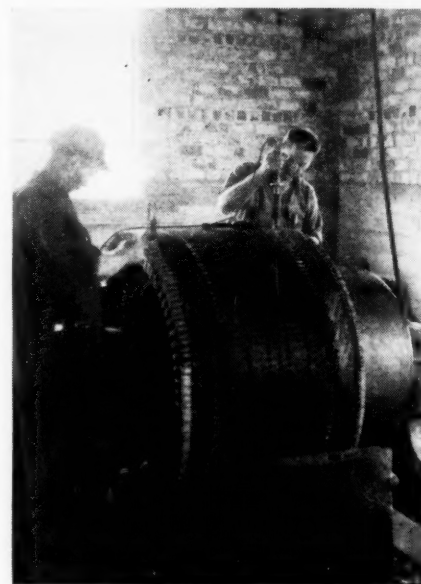
Handy in several ways.

with hand and foot stirrups spliced into it, is used from the station on the high wall. In case the wall is steep or slippery, the ladder is thrown over the wall for climbing out of or down into the pit. In the top of the turret, which is shown with the cover open, is a telephone, connected through cables and overhead lines to the office.

Idle Electric Hoist Reconditioned For New Harmony Mine

By reconditioning and some redesign an idle electric hoist has been adapted to service at the new Harmony mine of the Linton-Summit Coal Co., sunk through the No. 6 and No. 5 veins to the No. 4 just east of Sullivan, Ind. Harmony is now being equipped for operation. The hoist in question, an Ottumwa-General Electric unit with Ward Leonard control, had been out of service many years. The ravages of time, a deeper shaft and larger cars for the new mine combined to require a general overhauling of this equipment.

The switchboard needed little but a good cleaning up. Because the insulation had degenerated, both units of the motor-generator

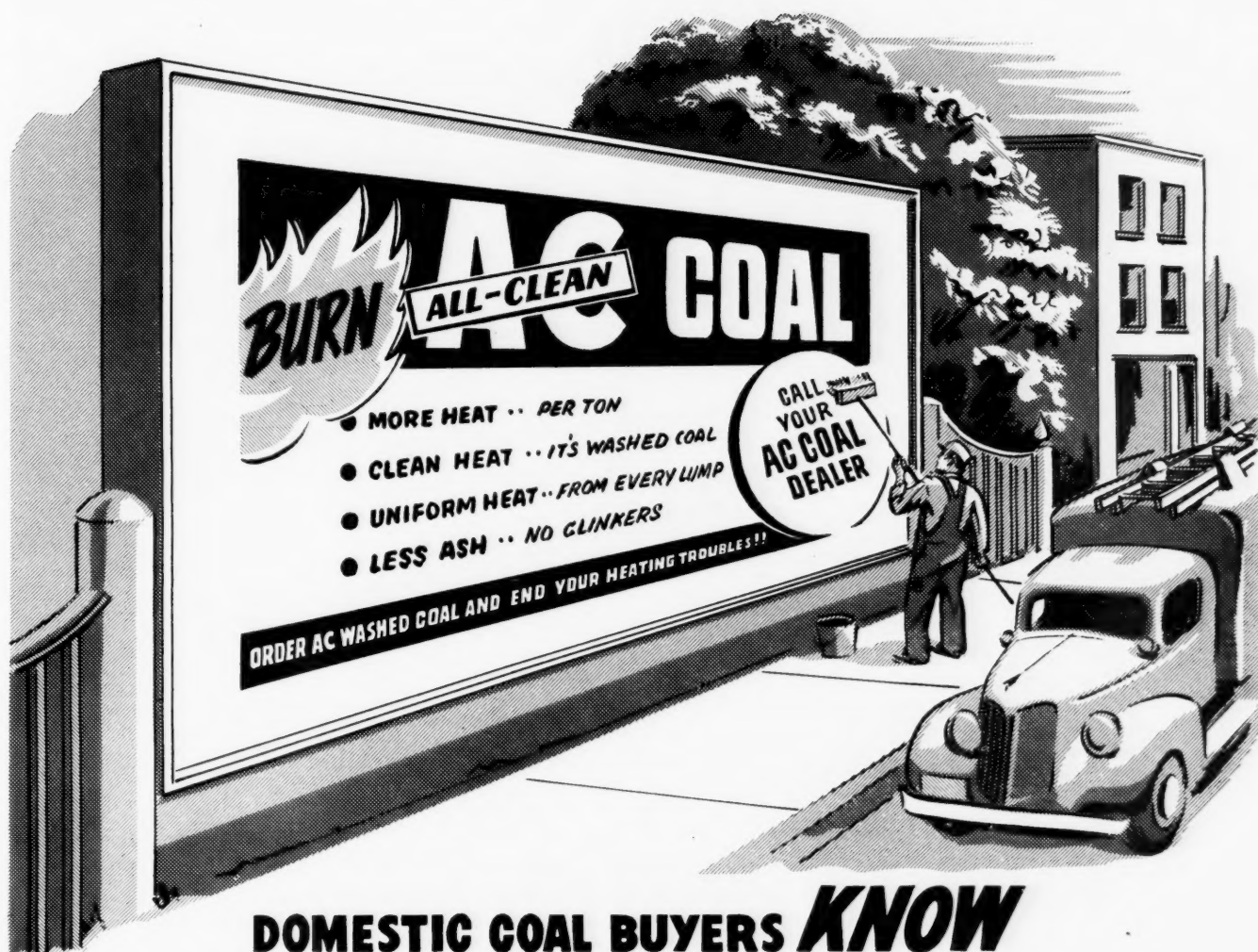


Rebuilding for a new hoisting stretch.

set were rewound and the field windings thoroughly dried by electric heating units under a tarpaulin. But the hoist, being too fast for the larger cars, needed mechanical changes as well as an electric overhauling.

A new step drum of smaller diameter made some reduction in rope speed. It was easily applied but did not go far enough. A further reduction of speed was effected by reducing the pinion diameter about 6 in. without changing the gear. This necessitated sliding all the high-speed-shaft pillow blocks nearer the main shaft by 3 in. and drilling new bolt holes. It happened that the pads on the base were long enough to permit this operation with a little babbitt filling under the overlapping edge.

The motor armature insulation was greatly deteriorated by time. So all the armature coils were removed and the cotton was stripped off and replaced with glass tape. The mica and other slot insulation was found to be in



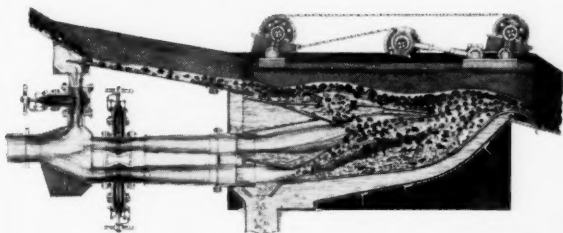
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Consumer demand is going to force more and more of your retail dealers to swing to CLEAN, uniform, washed coal this year . . . and widely discussed programs for smoke elimination, too, will definitely lend their influence. Don't miss this broad market because you think washing equipment is expensive . . . let us send you the facts on the Morrow-Prins Multi-Flow Coal Washer. The initial cost and operating figures will be a revelation to you.

Installation of a Morrow-Prins Washer in your tipple can be rapidly accomplished without disturbing your present production.

Why not let a Morrow Engineer give you complete details soon?

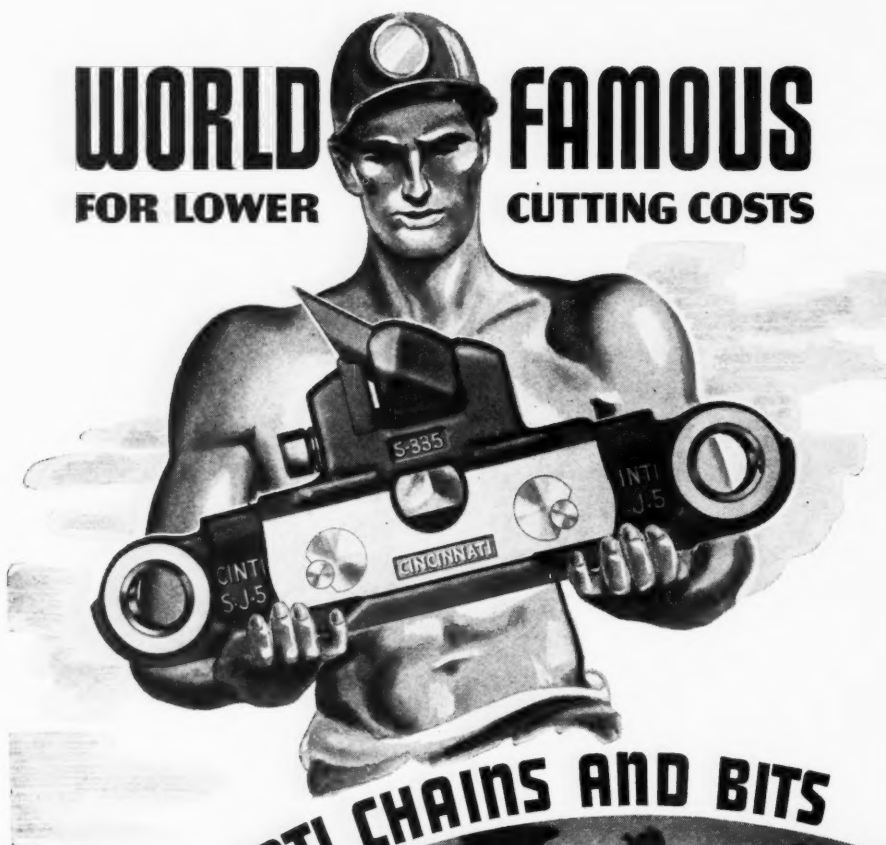
THE MORROW-PRINS *Multi-Flow* COAL WASHER
America's Most Flexible Coal Preparation Unit



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DESIGNERS AND BUILDERS OF COAL HANDLING EQUIPMENT FOR OVER 25 YEARS

WORLD FAMOUS FOR LOWER CUTTING COSTS



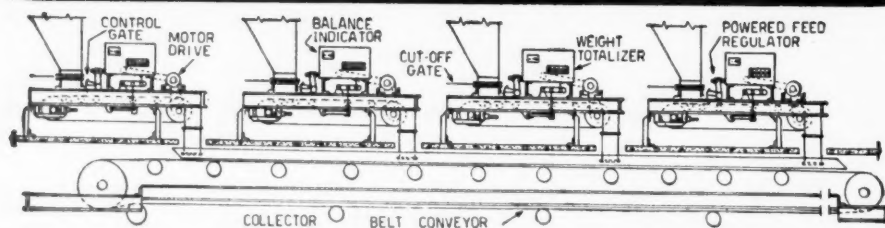
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For accurately weighing coal to a mixing conveyor—Controls the rate of feed and continuously totalizes the weight delivered

MERRICK SCALE M'FG. CO., Passaic, New Jersey

good condition. The reinsulated coils were replaced in the slots, wedged in place and soldered to the risers, using high-temperature solder. An electric soldering iron was used in this work. The condition of the commutator of this 800-hp. 350-r.p.m. motor indicates there has been little wear and there is reason to believe that this hoist is good for many years of service on its new job.

Divided Pond Plus Silt Pump Improve Wash-Water Supply

Dividing the pond and installing silt-pumping equipment was the simple solution to the problem of conserving washery water developed by Ed Larson, superintendent, for the Coulterville (Ill.) operation of the Florida Coal Co. This step was taken because the original settling pond was being filled up by accumulated silt.

The pond was divided into two approximately equal parts by a dam across the center. A 150-g.p.m. single-stage motor-driven Deming centrifugal pump was set on a platform built out into the lower half. A suction hose, supported on a raft made of four oil barrels and a few planks, is moved over the area within reach, as indicated in an accompanying illustration, pumping the sludge, or silt, from the bottom of that section over the dam into the upper section.

A few bales of straw (see illustration) make a filter in the upper-section overflow, and the clear water runs back to the lower half of the pond. As the settlings fill up the upper section, dikes will be raised completely around it to increase its capacity.



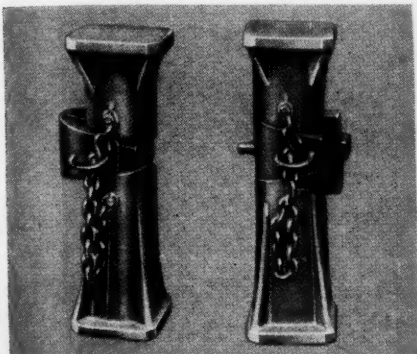
Showing the silt pump in action in the lower section of the pond.



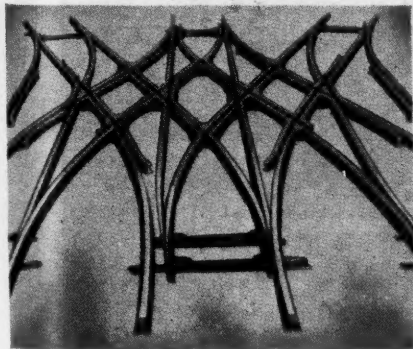
Bales of straw make a filter in the overflow from the upper section.

Steel meets the challenge of faster... more efficient production

U-S-S STEEL TIES assure safe and rapid movement of heavy equipment. Derailments are substantially reduced as the track is held in permanent alignment. Shallow in depth, headroom is increased. They are easily laid with few tools, and may be moved from room to room in whole sections.



U-S-S COLLAPSIBLE MINE POSTS provide positive roof control, give greater security in your longwall and room and pillar operations. They are easy to remove, and easy to retrieve because all parts are chained together. As they are practically indestructible, they can be used indefinitely.



U-S-S LORAIN SPECIAL TRACKWORK has proven its reliability for over fifty years. More efficient frogs, crossings and switches speed production by reducing derailments to a minimum. These items can be made to fit your special requirements.



EQUIPMENT today must take a beating standing up. Capacity production and the use of heavier, high-speed machinery call for increased strength and durability everywhere in the mine.

Steel is the one material that continues to meet the test. Steel room timbers and posts speed production by enlarging the working area. Their greater strength promotes safety.

Steel ties assure safe, efficient trackwork. And steel is economical in the long run. Long lasting, permanent where wanted, it can be re-used.

Carnegie-Illinois makes the right steel for every mine use. Why not consult a Carnegie-Illinois engineer on your next problem involving the use of steel? He will be glad to work with you, and there is no obligation for this service.

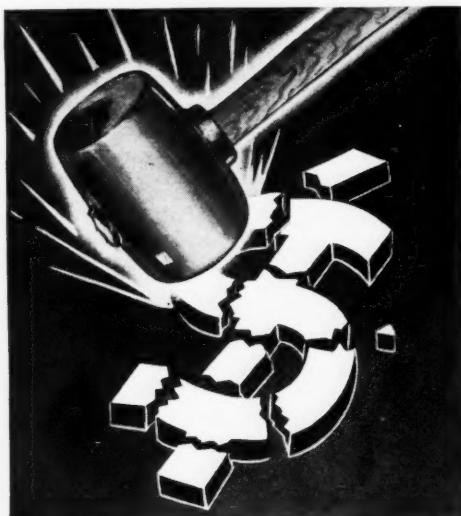
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A COST WE CAN HELP YOU CONTROL AND BRING DOWN

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All of this is available to you through the cooperation, specialization, and experience of the Bituminous Casualty Corporation.

Back of this financially-sound organization are 24 years of experience in the field. Bituminous Casualty maintains a modernly equipped Industrial Hygiene laboratory to assist in accident prevention activities, to afford better health and security for men engaged in the mining industry. Bituminous Casualty's qualified engineers work at your properties, with you and your men, to find and suggest ways and means to greater all-around safety.

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ROCK ISLAND ILLINOIS



WHAT'S NEW IN THE FIELD

Hearing on Freight Rate Boost Concluded Before I.C.C.

Hearing of testimony and argument on the plea of the railroads for increased rates—*Coal Age*, January, 1942, p. 73—was concluded before the Interstate Commerce Commission at St. Louis, Mo., on Jan. 14. Testimony of the carriers, shippers and other interested parties was given during the week beginning Jan. 5, and argument was presented Jan. 12-14. Testimony of coal witnesses was adduced Jan. 6 and 7, that of the National Coal Association being put in by Traffic Manager Estes.

Karl D. Loos, who argued for the N.C.A., declared that any increase in freight rates on coal that may be authorized should be only temporary, preferably with a definite expiration date. Any new tariff, he added, should be treated only as an emergency measure. If no expiration date is fixed, he said, the Commission should retain the power to alter or suspend the rates at any time. This line of argument was followed by many other coal and coke representatives.

12-Man War Labor Board Named Headed by W. H. Davis

Asserting that "the national interest demands that there shall be no interruption of any work which contributes to the prosecution of the war," President Roosevelt created by executive order on Jan. 12 a National War Labor Board, naming as its chairman William H. Davis, head of the National Defense Mediation Board, which was abolished by the order.

The new twelve-man board was given broad powers to adjust all kinds of labor disputes, including union demands for a closed shop. In so doing the President overruled a plea from industrial management that the union shop issue be ruled out as a proper grievance for government mediation and arbitration during the war. The board's members, equally divided among representatives of the public, employers and employees, include the following:

PUBLIC—Mr. Davis, George W. Taylor, of Philadelphia, a University of Pennsylvania economics professor and impartial umpire under the collective bargaining contract between the General Motors Corporation and the United Automobile Workers, who was named vice chairman; Dean Wayne L. Morse, University of Oregon Law School, and Dr. Frank P. Graham, president, University of North Carolina.

EMPLOYERS—Albert W. Hawkes, Montclair, N. J., president of the Chamber of Commerce of the United States and president of Congoleum-Nairn, Inc.; Roger D. Lapham, San Francisco, chairman of the board of American-Hawaiian Steamship Co.;

E. J. McMillan, Knoxville, Tenn., president of Standard Knitting Mills, Inc., and Walter C. Teagle, chairman of the board, Standard Oil Co. of New Jersey.

LABOR—Thomas Kennedy, Hazleton, Pa., secretary-treasurer, United Mine Workers (C.I.O.); George Meany, New York, secretary-treasurer, American Federation of Labor; R. J. Thomas, Detroit, president, United Automobile Workers (C.I.O.), and Matthew Woll, New York, vice president of the American Federation of Labor.

Keeping Step With Coal Demand

Bituminous Coal Stocks

	Thousands Net Tons Dec. 1 1941	P.C. Change— From Nov. 1 1941	From Dec. 1 1940
Electric power utilities.	12,427	+4.3	+8.9
Byproduct coke ovens.	8,326	-0.5	-17.5
Steel and rolling mills.	899	-1.0	+30.1
Railroads (Class 1)....	9,726	+1.9	+69.2
Other industrials*.....	20,626	-0.6	+37.7
Total.....	52,004	+0.9	+21.1

Bituminous Coal Consumption

	Thousands Net Tons Oct. 1941	P.C. Change— From Sept. 1941	From Oct. 1940
Electric power utilities.	5,531	+6.5	+20.7
Byproduct coke ovens.	6,848	+2.8	+0.7
Steel and rolling mills.	912	+2.9	+1.9
Railroads (Class 1)....	8,747	+0.06	+15.2
Other industrials*.....	12,516	+1.04	+12.8
Total.....	34,554	-1.2	+11.6

*Includes beehive ovens, coal-gas retorts and cement mills.

Coal Production

Bituminous

Month of December, 1941, net tons..	46,667,000
P.c. inc. over Dec., 1940.....	12.7
Jan.-Dec., 1941, net tons.....	502,860,000
P.c. inc. over Jan.-Dec., 1940.....	10.9

Anthracite

Month of December, 1941, net tons..	4,106,000
P.c. dec. from Dec., 1940.....	15.0
Jan.-Dec., 1941, net tons.....	54,339,000
P.c. inc. over Jan.-Dec., 1940.....	5.5

Sales of Domestic Coal Stokers Vs. Oil Burners

	Coal Stokers	Oil Burners
November, 1941.....	10,613	12,938
P.c. change from Nov., 1940..	-1.4	-26.6
January-November, 1941.....	181,404	184,676
P.c. change from Jan.-Nov., 1940.....	+26.2	+5.9

Index of Business Activity*

Week ended Jan. 10 (preliminary).....	163.4
Percent change from month ago.....	-0.5
Percent change from year ago.....	+14.3

*Business Week, Jan. 17.

Electrical Power Output†

Week ended Jan. 10, kw.-hr.....	3,480,344,000
P.c. change from month ago.....	-0.4
P.c. change from year ago.....	+15.9

†Edison Electric Institute.

West Virginia Coal Mines Set Safety Record

West Virginia coal mines established an all-time safety record in 1941, according to a report on Jan. 3 by the State Department of Mines. With an estimated output of 140,000,000 tons, there were 290 fatalities, or an average of 482,750 tons per fatality. This was 18 percent better than the figure for 1940 and 35 percent better than the average for the preceding five years.

Man-hours worked per fatality in 1941 were 573,500, the department reported, or 20 percent above the preceding five-year average.

The only two years of higher production were 1926 and 1927, when 144,603,574 and 146,088,121 tons, respectively, were obtained.

Pyramid Buys Indiana S. O. Coal Properties

A deal was closed late in December for sale of coal mining properties of the Standard Oil Co. of Indiana at Carlville, Ill., to the Pyramid Coal Corporation, according to an announcement by the former. The properties, including two mines and rights to coal under adjoining acreage, were acquired in 1917. The mines had not been operated recently, the oil company said, because market conditions enabled it to purchase coal advantageously.

Federal Coal Mine Inspectors Go to Their Posts

Forty-two federal coal-mine inspectors, fresh from an intensive training course at the U. S. Bureau of Mines Central Experiment Station, Pittsburgh, Pa., went to their posts on Jan. 1 throughout the nation's coal-mining states. Acting under the new federal coal-mining inspection law, the government has thus started regularly authorized safety inspection of mines for the first time, Dr. R. R. Sayers, Director of the Bureau, reported on Jan. 4 to Secretary of the Interior Harold L. Ickes.

The job of these inspectors is to probe unsafe and hazardous mining conditions which, through injury and death to workers and destruction of property, could slow down defense production and increase the cost of coal, said Dr. Sayers. The inspectors will make recommendations for improving health and safety factors affecting workers in more than 6,000 large operating coal mines. This initial action will increase in scope, not only for the purpose of cutting coal-mine deaths but also as part of the Department of Interior program of mobilizing natural resources for war.


Forerunners of more than 100 inspectors authorized under the inspection act, the 42



When you have to hurry with ventilation in order to get production going without costly delays, it pays to use *Genuine Flexipipe*. This method of ventilation for mines and tunnels can be installed easily...quickly...economically.

The tough, specially woven and treated fabric of *Genuine Flexipipe*, resists damage from gas, fungus growth, heat, acid and alkaline waters... it has strength to stand up under rough usage. It is economical and practical under almost any mining condition. Available in three grades.

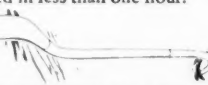
Mail the coupon today for descriptive literature on *Genuine Flexipipe*.



EASY TO HANDLE! *Genuine Flexipipe* is easy to carry. 1000 feet, with blower equipment, can be loaded in a single mine car.



EASY TO INSTALL! A thousand feet of *Genuine Flexipipe* has been installed in less than one hour.



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men were chosen for long experience in practical mining operations and safety work. The six-weeks refresher course put at their disposal all modern developments and practices in mine safety and acquainted them with Bureau policy and procedure. Another group of about 70 newly hired inspectors reported in Pittsburgh on Jan. 5 for training. Immediately upon completion of the course in mid-February they will join the first contingent in the coal fields of the Appalachians, the Midwest and the Rockies.

L. & N. Engineer to Advise On Smoke in Louisville

Eugene D. Benton, combustion engineer, of Cleveland, who has been permanently employed by the Louisville & Nashville R.R. to advise on proper methods of combustion and reduction of smoke in Louisville, Ky., arrived in the city on Jan. 6 and will be available to aid all industrial and other consumers of coal in solving combustion and smoke problems. He announced that he was confident that the smoke nuisance could be materially reduced by proper firing in the large plants, and that this could be accomplished in short order with proper cooperation of the plant owners.

Mayor Wilson Wyatt said: "The city will be more than glad to meet with Mr. Benton, discuss the entire situation with him, and we will be interested in his suggestions and recommendations." Mr. Wyatt also acknowledged receipt of letters from James B. Hill, L. & N. president, and the Louisville Coal Institute (an organization of dealers) proposing that something be done about the smoke problem and offering their aid.

"An ordinance in itself does not abate smoke," said Mr. Benton. "It is a long and hard task. But it is true, when you use Kentucky coal and get a lot of smoke, you are not getting the full value of the coal. Smoke is a danger signal to efficiency. I hope to cooperate with any municipal agency set up to abate smoke and at the same time keep myself available for advice and counsel to any user who has a problem. I'm quite sure that if we can work on this basis we can reduce the smoke here materially."

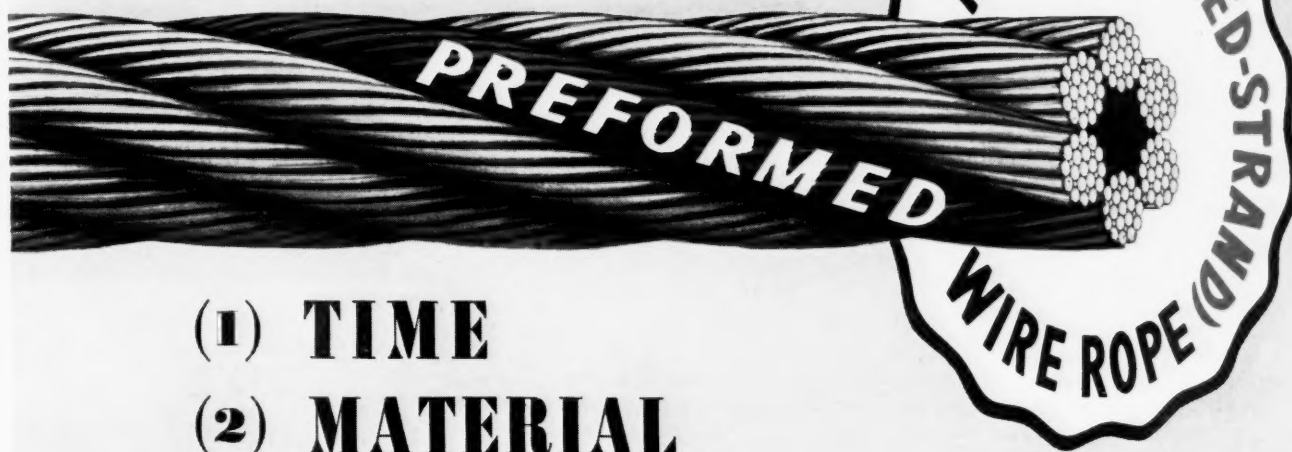
Bradshaw Property Sold

The Southern Coal Corporation, organized in December, 1941, with offices in Bluefield, W. Va., has purchased the Bradshaw Coal Co. property for "around \$90,000." The Bradshaw company, with a mine at Bradshaw, McDowell County, has been operating since 1918, its recent production having been about 16,000 tons monthly.

To Reforest Stripped Areas

Two million trees are to be planted on strip-mine properties in Illinois next spring as the result of an agreement reached between the State Department of Conservation and the Illinois Coal Strippers' Association, it was announced late in December by Livingston E. Osborne, Director of Conservation. These trees will reforest about 2,000 acres, the director said, which roughly corresponds

A Timely 2-Way Saving With



- (1) TIME
- (2) MATERIAL

How can production be speeded? How can essential materials be best conserved? These, today, are vital questions.

With wire rope, the answer is in using the quality, construction and type that can be installed the quickest . . . that will last the longest, and thus do the most work for the amount of materials employed.

You can depend on Preformed "HERCULES" (Red Strand) Wire Rope for this 2-Way Saving. It not only lasts longer — which means fewer replace-

ments—but because it is easier to handle, it can be installed more quickly. It provides all the advantages of the preforming process, *plus* the inherent qualities and advanced manufacturing methods that have long since caused the "Red Strand" to be recognized as the sterling mark for wire rope.

Why not take advantage of this 2-way saving? In doing so you will also be reducing your operating costs, for the principles that make "HERCULES" long lasting, also make for maximum economy.

Preformed "HERCULES" (Red-Strand) Wire Rope is furnished in both Round Strand and Flattened Strand constructions. In this one grade there is a right rope for every heavy duty service.

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to the acreage stripped for coal during the last year. The policy of the coal officials, he added, is to reforest as many acres as are stripped annually.

The plantings will be made in Fulton, Grundy, Henry, Jackson, Knox, LaSalle,

Perry, Randolph, Saline, St. Clair, Will and Williamson counties and will include such varieties as short-leaf pine, silver maple, cottonwood, black locust, black walnut, white oak, bald cypress, loblolly pine, jack pine and red pine, according to Mr. Osborne.

War Plans Cause Ickes to Urge Fuel Stocking; Coordination Framework Completed

BECAUSE of increasing momentum of the nation's war program, Secretary of the Interior Harold L. Ickes, Solid Fuels Coordinator, on Jan. 8 warned industries that depend upon coal and coke for fuel and raw materials that to protect their fuel supply they must act now to build up storage piles while surplus mine and transportation facilities are available. He said the war plan laid down in President Roosevelt's message to Congress voids all previous yardsticks by which fuel needs and the sufficiency of fuel production and transportation facilities might be measured. Consumers who are caught without adequate coal stocks when the full force of the war program and its repercussions break upon the nation may find themselves in a precarious position.

The coordinator urged all users of anthracite, bituminous and coke—both industrial and domestic—to take advantage of the surplus mine and transportation capacity which will be available for a short while longer to build up their stockpiles to the limit, and then do everything they can to keep them there. Coal in your bin during times like these, he said, is the best possible protection against shortages. He said this would help the war program and not be detrimental hoarding. Such a move would lessen the possibility that consumers will have to appeal to the government for help in getting fuel after the going gets tough.

Mr. Ickes said that the greatly expanded war program will heap new and unpredictable burdens upon all solid fuels. Shortages in machinery, electric power, electrical and other mining equipment, tires for trucks and other supplies vital to the production and transportation of solid fuels may be ex-

pected. Also transportation, which is a vital factor in fueling the nation, will be affected by the new war program. The result all of this will have on the fuel supply cannot be foretold at this time.

From now until April 1, when the Great Lakes navigation season opens, the mines and transportation facilities will have a surplus capacity which consumers can utilize in piling up coal in their storage bins to safeguard them against trouble later. But on April 1 the mines and transportation facilities will begin their annual drive to stock the Great Lakes docks which supply the Lake States and part of Canada the year round. That, with the gathering momentum of the war program, will tighten the coal supply situation considerably.

Secretary Ickes called attention to the President's statement to Congress that to attain the overwhelming superiority the United States must have to achieve victory over the Axis nations our production of war materials "must be raised far above present levels, even though it will mean dislocation of the lives and occupations of millions of our own people. We must raise our sights all along the production line. Let no man say it cannot be done. It must be done, and we have undertaken to do it."

This, Secretary Ickes said, means we must have fuel in quantities necessary to do the job, at the places where it is needed and when it is needed, no matter what the difficulties are. The Office of Solid Fuels Coordination proposes to see that this is done, he said.

Mr. Ickes has asked the Governors of the 48 States to aid him in determining the solid-fuel requirements of all State, county,



Thomas J. Thomas



Ralph Park Russell



Howard A. Gray



Brig. Gen. Brice P. Disque



Harlen M. Chapman

municipal and other local governmental agencies as a part of his program to coordinate the supply of solid fuels for the war-time emergency. In letters to the governors, he recognized the importance of an ample supply of solid fuels to State and local governmental agencies, and strongly recommended that they plan their fuel purchases to provide a comparatively large supply for storage purposes.

"Coal is a major source of energy for the operation of government-owned and operated utilities, such as water, gas, and electric power plants," his letter stated. "It is also the primary fuel for heating many State hospitals and similar public institutions, the nation's public schools, and a host of public buildings in which the State, county, and city governments carry on their work. Activities of these various agencies must be continued in war time. In fact, the majority of them are vital to the success of the national war effort."

Four Coordinators Named

Completion of the framework of the organization to carry out the work of coordination of solid fuels was announced by Mr. Ickes on Dec. 31. The four top officers selected are to serve with Howard A. Gray, Acting Director of Solid Fuels Coordination, to aid Secretary Ickes in carrying out the President's instruction that adequate steps be taken to assure that supplies of bituminous coal, anthracite and coke will be sufficient to carry out the expanded war program and civilian needs. The new officers, all of whom accepted for immediate service, are:

Thomas J. Thomas, Chicago, president of the Valier Coal Co. and assistant to the president of the Chicago, Burlington & Quincy Railroad Co., named Associate Director of Solid Fuels Coordination in charge of bituminous coal.

Ralph Park Russell, Northumberland, Pa., formerly superintendent of car service for the Pennsylvania R.R., named Associate Director of Solid Fuels Coordination in charge of transportation.

Harlen M. Chapman, formerly vice president of the Hudson Valley Fuel Corporation, Troy, N. Y., named Assistant Director of Solid Fuels Coordination in charge of coke.

Brig. Gen. Brice P. Disque, New York City, director of the Peoples National Bank & Trust Co. and formerly president of the Anthracite Institute, named as Associate Director of Solid Fuels Coordination in charge of anthracite.

To devise proper and effective steps to insure the regular flow of coal through the Port of Norfolk, representatives of the Office of Solid Fuels Coordination, bituminous coal producers and railroads engaged in movement of coal to this tidewater port met at New York Jan. 20. The primary result of the meeting was the appointment of the "Hampton Roads Emergency Committee" with O. L. Alexander, president, Pocahontas Fuel Co., as chairman, and John A. Luse, secretary, District 7 Bituminous Coal Producers' Board, as secretary. Other members are: shippers—J. J. Halloran, C. H. Sprague & Sons; Edward Page, New England Coal & Coke Co. and the Mystic Steamship Co.; J. G. Miller, Old Ben Coal Corporation; and Charles Dunlap, Berwind-White Coal Mining



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MOROPA COTTON BRATTICE CLOTH has slashed production costs in the mines of many leading producers.

A SIMILAR COST SAVING—the key to profits these days—is yours for the asking. You will find an actual sample and full information about MOROPA on page 111 of the 1941 Coal Mining Catalogs (a McGraw-Hill Publication).

WE OFFER IMMEDIATE DELIVERY or extended contracts on all standard widths. Prompt action today will assure efficient ventilation for the all-out production days ahead.

MOROPA IS MADE IN AMERICA, of American cotton, and sold only by

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ELIMINATES HAND SWITCHES

It changes the current from trolley to reel automatically, eliminating shocks and burns to the operator. Built for 250 and 500 volts, for either single or double trolley and reel service.

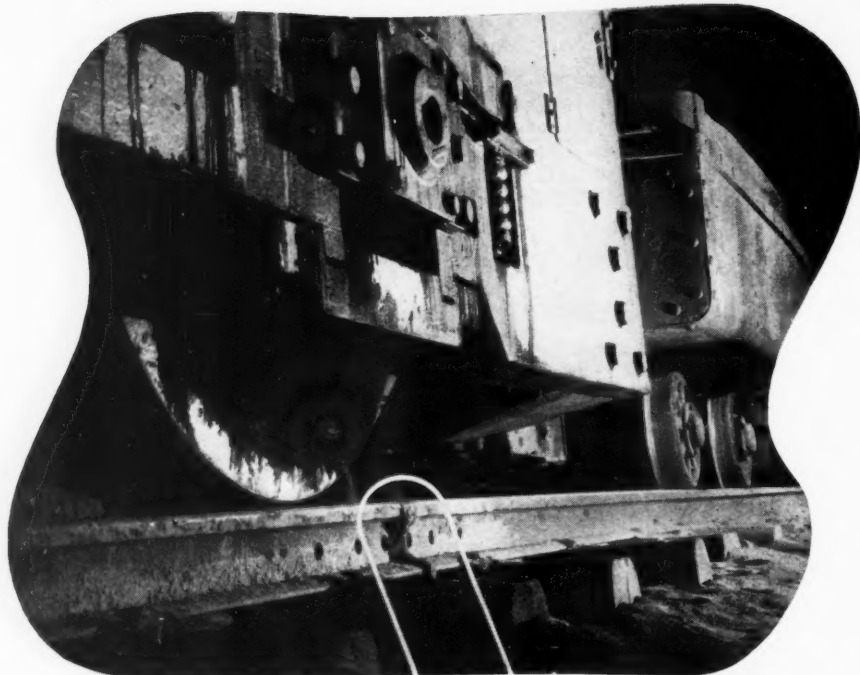
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The statement that Thermit welding of coal mine track saves money is no idle claim.

A recent test of 104 joints in a leading mine showed the cost of a Thermit welded joint over the life of the track to be \$5.24, compared with \$6.56 for the conventional angle-bar-and-bond joint.

Chief reasons for the economy of Thermit welded track are substantial power savings, due to the superior conductivity of continuous rail, and the complete elimination of joint repairs, which represent about 45% of track maintenance costs.

Other benefits of Thermit welded coal mine track are longer rail life because of absence of battered and cupped rail ends, smoother operation of cars, and less wear and tear on rolling stock.

Send for booklet, "Continuous Rail for Main Haulage Track."

VICTORY NOTE

Tremendous demands for aluminum for war production have caused a temporary shortage of Thermit for rail welding. You will want to keep this ideal rail joint in mind, however, if you cannot get Thermit today.

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Co.; consumers—R. L. Fletcher, Providence Gas Co., and P. C. Savage, Consolidated Edison Co.; railroads—A. T. Lowmaster, Chesapeake & Ohio Ry.; and R. H. Smith, Norfolk & Western R.R.

Illinois Preparation Society Hears About Cleaning

The fundamentals of coal cleaning and a discussion of combination wet-and-dry plants including descriptions of certain types of equipment used in such, were among the subjects discussed by W. C. McCulloch, Roberts & Schaefer Co., at the December meeting of the Illinois Society of Preparation Engineers and Chemists. Pointing out, among other things, that the consumer wants uniformity, Mr. McCulloch observed that, in washing, automatic controls are the things that do the job. The human element cannot be depended upon. Cleaning results which can be obtained, however, reflect the ash characteristics of the coal being processed. Automatic control of dry-cleaning equipment, on the other hand, is not so good. It is better, he remarked, to rely on re-treatment of the middlings.

Reconditions Generating Plant

Old Ben Coal Corporation is reconditioning the generating plant at its No. 11 mine, Christopher, Ill., to the extent that its 2,500-kw. steam turbo generator may be put into regular service. This is a protective measure against possible curtailment of central-station power, due to defense activities.

History of American Coal

After eight years of painstaking work and exhaustive research, Howard N. Eavenson has published his third book, "The First Century and a Quarter of American Coal Industry," showing the beginnings and growth of our major fuel production. It is a source book, but also presents the considered opinion of a man who knows every phase of the coal business from the viewpoints of both the student and operating man. Six of the 14 maps are originals, never reproduced before, and in 85 production tables is shown the growth of output in every coal State, most of them subdivided by counties (1) as reported in contemporary publications and extant histories, and (2) as estimated from logical consideration of the available data.

Coming Meetings

- American Society for Testing Materials: spring meeting, March 2-6, Cleveland, Ohio.
- American Mining Congress: coal convention and exposition, April 27-May 1, Music Hall, Cincinnati, Ohio.
- Mine Inspectors' Institute of America: annual convention, May 25-27, Lafayette Hotel, Lexington, Ky.
- Illinois Mining Institute: 24th annual boat trip and summer meeting on Str. "Golden Eagle" from St. Louis, Mo., June 5, 6 and 7.

POWER...

FOR CAPACITY PRODUCTION

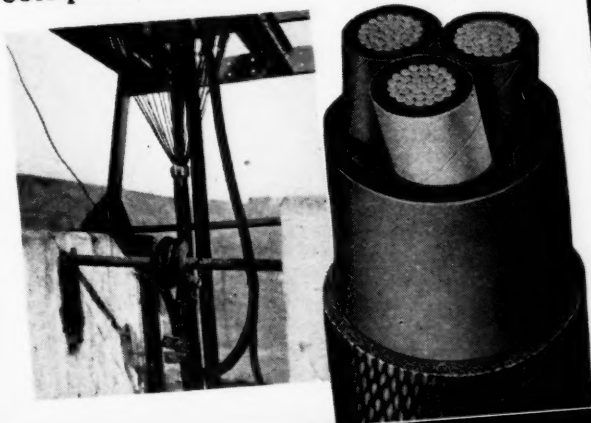
Get it Safely... Surely *with* **HAZARD** **MINE POWER CABLES** **for Shafts and Boreholes**

Hazard submarine type rubber insulation assures the moisture-resistance . . . toughness . . . and resiliency that mine power cables need for long, trouble-free life when installed in shafts or boreholes.

In addition, Hazard offers two types of outside covering for further protection:

HAZARD SPIRALWEAVE

... recommended for lighter weight cables—is a heavy "fire hose" type of cotton fabric (loom-woven with heavy seine twine cord) woven directly on the cable and saturated with time-proven, weatherproof compound.



HAZARD STEEL ARMOR

... for heavier cables or where great mechanical protection is required. It provides a full layer of galvanized steel armor wire covered with an outer layer of asphalted jute. The armor wires may be used to make the cable self-supporting.



These cables are available in a full range of conductor sizes for various voltages. Hazard Engineers . . . without obligation . . . will gladly help you select the best type of cable for your particular requirements. Call on us anytime.

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ELECTRICAL WIRES & CABLES FOR EVERY MINING USE



**YOU CAN
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STOKER
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**TRAMP
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**MAGNETIC
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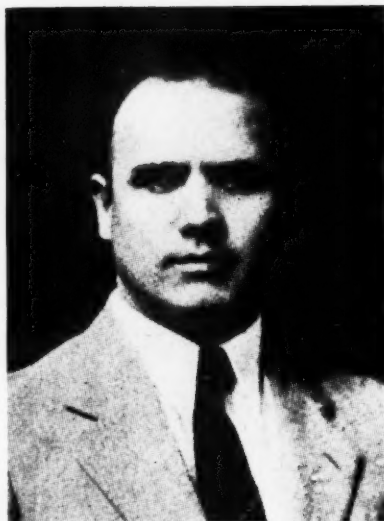
Air cooled, because they are ventilated, and will provide a powerful, positive, automatic and economical means of diverting tramp iron from your product. Made in a wide variety of sizes to fit your conveying system or in self contained units, all sizes, for moving from place to place. Ask for Bulletin 302.

It may be that an automatic spout type magnet will better suit your needs. Being satisfactorily used in many outstanding coal conveying systems. Get our Bulletin 97-A.

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Personal Notes

W. L. AFFELDER, vice president of the Hillman Coal & Coke Co., Pittsburgh, Pa., has been elected as a member of the board of directors of the National Coal Association. He takes the place of C. W. GIBBS, who has retired from the coal industry.

VAN AUSTIN has been appointed mine manager for the recently reopened Bobby Dick mine of the Freeman Coal Mining Co., Herrin, Ill.

TOM BENDALL, face boss at Castle Gate mine of the Utah Fuel Co., has been named foreman. He has been with the company for 15 years. He succeeds Jim Westfield, deceased.

JAMES F. BRYSON, for 14 years safety director of the Harlan Coal Operators' Association, has been appointed general manager of the Black Star Coal Co. and the Pioneer Coal Co., with headquarters at Alvah, Ky. Mr. Bryson, who takes over part of the duties of the late Lloyd S. Speed, who was president and general manager, also organized the Harlan Mining Institute, of which he was secretary, and the Harlan County Mining School, for which he served as director. He also was coordinator for the Harlan County Civilian Defense Council.

GEORGE F. CAMPBELL, vice president, Old Ben Coal Corporation, was elected president of the Illinois Coal Operators' Association at its 13th annual meeting. Other officers named are: secretary, FRED S. WILKEY; treasurer, C. W. PETERSON; general counsel, THURLOW G. ESSINGTON.

JOHN T. FALLON, Belington, W. Va., former superintendent of the West Virginia Coal & Coke Corporation mines at Junior and Norton, has opened the Junior mines, closed since Oct. 1.

HAROLD C. M. GORDON, formerly assistant manager of the Acadia Coal Co., Stellarton, N. S., and Old Sydney Collieries, Ltd., Trenton, N. S., has been elected president and general manager of both companies, vice MICHAEL DWYER, resigned.

THOMAS HITCHCOCK, of New York City, chairman of the board, Ayrshire Patoka Collieries Corporation, Indianapolis, Ind., has been commissioned as a major in the U. S. Army Air Corps and has reported for duty. He was a member of the Lafayette Escadrille in World War No. 1.

THOMAS HOLLAND has been designated Administrator of the Wage and Hour Division until a successor to General Fleming is appointed, which must be by Feb. 14, according to the law. BAIRD SNYDER, who had been Acting Administrator, resigned to accept the post as General Fleming's assistant in the Federal Works Agency. Mr. Holland is an attorney and has served as Director of the Division's research and statistics branch and chairman of the Public Contracts Board.

C. S. KELLUM, of Alabama, has been appointed superintendent of the Gulf, Mobile & Ohio R. R. mine, Sparta, Ill., now being reconditioned and improved with new screening and washing equipment under his direction.

W. J. B. MAYO, superintendent of the Melcroft Coal Co. operations of the Koppers interests, has also been named to the superintendency of the Sonman mines of the Koppers company, near Johnstown, Pa.

R. H. MORRIS, general manager, Gauley Mountain Coal Co., Ansted, W. Va., has been elected chairman of the Central Appalachian Section, American Mining and Metallurgical Engineers. Other officers named are: vice chairmen, L. I. COTHERN, Blacksburg, Va.; A. R. MATTHEWS, Closplint, Ky.; ALFRED R. FLINN, Austinville, Va., and CARL SCHOLZ, Charleston, W. Va. G. R. SPINDLER, Morgantown, W. Va., is secretary.

P. R. PAULICK has severed his connection as chief engineer with the Powhatan Mining Co., Powhatan Point, Ohio, to go into business for himself as free-lance consultant in mine mechanization.

GEORGE A. SCHULTZ has been appointed general manager of the Liberty Fuel Co., Latuda, Utah. He has been with the company 23 years.

W. S. SPEED, Louisville, Ky., chairman of the board of the Black Star Coal Co. and the Pioneer Coal Co., has resumed the post of president made vacant by the recent death of Lloyd Speed, who held both this and the general manager's offices.

WILFRED S. WEBSTER has been appointed vice president and general manager of Walter Bledsoe & Co. with offices at Terre Haute, Ind.

WALTER WALSTRIP, for the last 25 years an accountant for William R. Carney, Scandia Coal Co., Des Moines, Iowa, has been named to the Division of Accounting of the Office of Price Administration.

ROLAND WILSON has been made superintendent of the reopened Bobby Dick mine of the Freeman Coal Mining Co., Herrin, Ill.

L. F. WORKMAN, general superintendent of the Lorado Coal Mining Co., Lorado, W. Va., with which he had been associated for 27 years, left its employ on Jan. 3 for Pittsburgh, Pa., to begin training as a federal mine inspector.

**DRAGGED FOR 2 YEARS
ALL OVER THE DAM...
STILL SERVING LIKE NEW**

Ground here is so hard, and rocks are so sharp, that power-shovel teeth must be sharpened every day—yet the G-E tellurium cable has carried load, undamaged, for more than two years. Green Mountain Dam, Kremmling, Col., the second largest earth-fill dam in the United States.

Water is no obstacle to good service from G-E tellurium portable cable. Here 18-ton trucks repeatedly run over the cable without damage to it.

**IT'S
TELLURIUM
CABLE**

DRAGGED continually over sharp rocks and through mud and water, this electric-shovel drag cable (6000-volt tellurium) is going on its third year of service. It has been in continuous service all this time, carrying current to power shovels working from the lowest level to the highest. Eighteen-ton trucks run over it repeatedly; the ground is so hard that the shovel teeth require sharpening every day. It has been exposed to the extremes of cold and heat that are characteristic of mountain altitude.

In addition to toughness (abra-

sion-resistance) and moisture resistance, tellurium cable is flexible—easy to handle. Tellurium portable and parkway (buried in earth) cables are two types in a complete G-E line of cable from which you can select exactly the right type for any job.

Next time you need portable power cable for shovels, cutters, loaders, drills, or motors, specify G-E tellurium cable and save money and time. To make sure of the right type and size of cable for your particular job, get in touch with our nearest office, or write *General Electric Company, Schenectady, N. Y.*

INSULATED CABLE



**THE RIGHT TYPE
FOR EACH JOB**

GENERAL  ELECTRIC

502-21-1200

Priorities on Equipment and Materials for Mines Revised and Broadened to Improve Service

PRIORITIES Order P-56, covering equipment and materials for mining operations, was twice amplified and amended in December, and with said revisions and amendments was continued in force from Dec. 31 until further notice. As amended on Dec. 2, all of the original order of Sept. 22 was retained, with the addition of provisions permitting mine operators to apply an A-3 rating to both new equipment and machinery and to repair and maintenance parts which formerly held an A-8 rating.

The new order covers all mining enterprises to which serial numbers have been or may be issued; provides for the inclusion of prospecting enterprises, refractory plants and foreign mines; covers both extraction and treatment of coal, metal and non-metallic products; provides for the use of an A-1-a rating in event of an actual breakdown or suspension of operations, and for an A-1-c rating in procuring materials needed to avert a breakdown or suspension.

Items covered by the A-3 rating are listed at the end of the order, reproduced below. Consumable operating supplies and equipment not included in the schedule, amended Dec. 31 to include certain products not previously covered, are covered by the A-8 rating of the original P-56 order. Orders for new machinery must be cleared through OPM but orders for ordinary repairs and maintenance may be handled directly with the supplier.

To enable mining-machinery manufacturers to facilitate acquisition of raw materials and to plan purchases in advance, a new order, P-56-A, replacing P-23, was adopted effective Jan. 1, 1942. To qualify under P-56-A, a manufacturer must fill in Form PD-25-a, making certain changes to adapt it to the purpose and setting forth his estimated requirements of critical materials for the first quarter of 1942. Upon approval by the Administrator of Mine Priorities he is then issued a new serial number and authorized to apply the A-3 rating in his purchases of steel, copper and other materials. The manufacturer also may apply at this time for materials needed in the second and third quarters of 1942, if orders from mines already on his books warrant such application.

From the standpoint of the mine operator, proceedings under the order are substantially the same as under P-23. In other words, new machinery may be purchased from a manufacturer who has received a serial number under P-56-a without the operator making individual application for the A-3 rating. Such individual application will be required, however, in ordering new machinery or equipment from a manufacturer or local shop which has not received a serial number under P-56-a.

[The Office of Production Management was absorbed into the new War Production Board, headed by Donald Nelson, on Jan. 23. Wilbur A. Nelson will continue to administer mines priorities as head of the Mining Branch, Materials Division, the staff of which remains the same. Any new mining orders, however, will be cleared and issued by the Industry Operations Division.]

Preference Rating Order No. P-56

(As Amended to December 2, 1941)

Section 982.1 is hereby amended to read as follows:

982.1—**PREFERENCE RATING ORDER.**—For the purpose of facilitating the acquisition of material for continued and expanded operation of Mining Enterprises, preference ratings are hereby assigned to deliveries of such material upon the terms hereinafter set forth, until such time as the Office of Production Management certifies specific quantities of such material to which the preference ratings herein assigned may be applied.

(A) Definitions.

(1) "Person" means any individual, partnership, association, corporation, or other form of enterprise.

(2) "Mining Enterprise" means

(i) any plant actually engaged in the extraction by surface, open-pit, or underground methods, or in the beneficiation, concentration, or preparation for shipment of the products of mining activity, but not including that form of mining known as "gold placer mining";

(ii) any plant wholly engaged in the processing and burning of refractories;

(iii) any prospecting enterprise for the discovery or exploration of new or additional mining projects.

(3) "Operator" means any person operating a Mining Enterprise, to whom a Serial Number has been issued in accordance with the provisions of paragraph (B).

(4) "Supplier" means any person with whom a purchase order or contract has been placed by an Operator or another Supplier for material

(i) required by an Operator for any of the purposes specified in paragraph (C) hereof;

(ii) to be physically incorporated in other material so required by an Operator.

(5) "Material" means any commodity, equipment, accessories, parts, assemblies, or products of any kind.

(6) "Maintenance" means minimum upkeep necessary to continue the working condition of equipment used by an Operator in and essential to the operation of a Mining Enterprise at its then current rate of production or operation.

(7) "Repair" means the restoration of property or equipment used by an Operator in and essential to the operation of a Mining Enterprise to a sound working condition after wear and tear, damage, destruction, or failure of parts or the like have made the property or equipment unfit or unsafe for service.

(8) "Operating Supplies" means material which is essential to and consumed in the operation of property and equipment used by an Operator in and essential to the opera-

tion of a Mining Enterprise and which is generally carried as Operator's stores and charged to operating expense account. The term does not include raw materials which enter into or form part of the finished product.

(B) Certification of Mining Enterprises.

(1) **Domestic Mining Enterprises.**—The agency designated by the Governor or other chief executive officer of each State, territory, or possession of the United States, including the Commonwealth of the Philippines, shall furnish to the Office of Production Management a certificate setting forth the names of the persons operating Mining Enterprises within such State, territory, or possession. The Office of Production Management will thereupon issue a Serial Number or Numbers to each such person who may be approved by the Director of Priorities. Any person aggrieved by failure or refusal of a State agency to certify him as an Operator may apply in writing to the Director of Priorities for issuance of a Serial Number. The Director of Priorities may thereupon take such action as he deems appropriate.

(2) **Foreign Mining Enterprises.**—The Director of Priorities may, in his discretion, issue a Serial Number or Numbers to a person operating a Mining Enterprise outside the limits of the United States, its territories, and possessions.

(3) **Standards.**—In issuing or denying Serial Numbers, the Director of Priorities will consider the importance to national defense of the present and prospective output of materials to be produced, the consumption of essential materials by the Mining Enterprise in its operations, the necessity to the Mining Enterprise of obtaining priorities assistance, and the available alternative methods of obtaining such assistance.

(C) **Assignment of Preference Ratings.**—Subject to the terms of this Order, the following preference ratings are hereby assigned, but nothing herein contained shall prevent the use of any other or higher rating to which any person may be entitled by reason of any other Preference Rating Certificate or Order.

(1) As to Deliveries to an Operator.

(i) A-1-a to deliveries of material for repair when and only when there has been an actual breakdown or suspension of operations because of damage, wear and tear, destruction, or failure of parts, or the like, and the essential parts are not otherwise available.

(ii) A-1-c to deliveries of material up to the minimum required to make reasonable advance provisions to avert an actual breakdown or suspension as described in paragraph (C) (1) (i).

(iii) A-3 to deliveries of material for other repairs to the types of machinery and equipment listed in Schedule A hereto.

(iv) A-3 to deliveries of essential machinery or equipment of the types listed in Schedule A hereto.

(v) A-8 to deliveries of material for repairs other than those specified in paragraphs (C) (1) (i), (ii), and (iii) and for maintenance or operating supplies.

(vi) A-8 to deliveries of essential machinery or equipment of types other than



Low Water in Tennessee Increases Coal Demand

This picture, taken Dec. 16 along the shore line of the Tennessee Valley Authority lakes, tells the story of abnormally light rainfall and increased demand for industrial power.

**LASTS 3 TO 5 TIMES LONGER
ON COAL WASHER SCREEN**

SUPERLA GREASE

1. High Load Carrying Ability. 2. Unique Heat Resistance. 3. Uniform Consistency.
4. Extreme Purity. 5. Stable.

• His SCREEN eccentric bearings "just naturally ran hot." At least that is what the Superintendent in an Illinois strip mine had decided. But, when a modern coal washing plant was installed and the new eccentrics also overheated and threw off the grease almost as soon as it was applied, he began to think it wasn't so natural. Even with the comparatively inexpensive grease he was using, lubricating costs were too high. Also, it took most of one oiler's time just to keep the eccentrics greased.

He decided to try the suggestion of a Standard Lubrication Engineer, "Use a good quality of grease and see if it doesn't save enough maintenance, oiler time, and grease to more than pay the difference in price." The Engineer recommended Superla Grease.

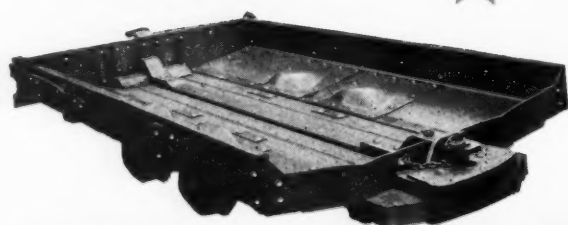
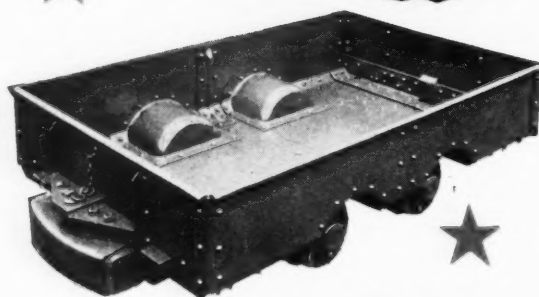
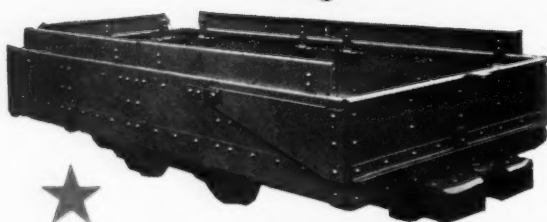
The first test was thoroughly convincing. Superla lasted 3 to 5 times longer. The oiler spent less than one-third the time lubricating the equipment. The saving in maintenance can only be estimated, but with the bearings operating at more normal temperatures, the danger of bearing failures was considerably reduced.

If your mine is located in the Middle West, there is a Standard Lubrication Engineer right in your locality. See if he hasn't a similar money-saving suggestion for you. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois. Ask to have a Lubrication Engineer call on you.

Copr. 1942, Standard Oil Company (Indiana)

STANDARD OIL COMPANY (INDIANA)

G...LUBRICATION ENGINEERING...LUBRICATION ENGINEERING...LUBRICAT



The job Uncle Sam has on his hands necessitates delay in all of us getting what we need. You may have to make your old mine cars do for a while yet . . . but now is the time to plan for future efficiencies.

NOW... INVESTIGATE

Enterprise

MINE CARS

You will find there a SURE way to get more car capacity and lower car operating costs. Your operating conditions may require a special study of car types and we have a trained engineering personnel that can certainly be helpful. A real opportunity to find new ways to cut costs and speed production later, when such things will count heavily, may result from such an investigation now. ENTERPRISE cars assure maximum tonnage hauled at lowest expense for car operation and maintenance.

ENTERPRISE

WHEEL & CAR CORPORATION

BRISTOL, VA.—TENN.

HUNTINGTON, W. VA.

those listed in Schedule A hereto, provided that such machinery and equipment are to be used in the actual productive operation of a Mining Enterprise.

(2) As to Deliveries to a Supplier.

(i) A-3 to deliveries of machinery or equipment of the types listed in Schedule A hereto, or repair material therefor, for delivery to an Operator under a rating assigned by paragraphs (C) (1) (i), (ii), (iii), or (iv), or to deliveries of material to be physically incorporated into material to be so delivered.

(ii) A-8 to deliveries of other machinery or equipment, or other material for repair, maintenance, or operating supplies, for delivery to an Operator under a rating assigned by paragraphs (C) (1), (i), (ii), (v), or (vi), or to deliveries of material to be physically incorporated into material to be so delivered.

(D) Persons Entitled to Apply Preference Ratings.—The preference ratings hereby assigned may be applied by

(1) An Operator, or

(2) A Supplier to enable it to make to an Operator or to another Supplier deliveries on purchase orders or contracts endorsed or otherwise identified pursuant to paragraph (E).

(E) Application of Preference Ratings.

(1) An Operator, in order to apply the A-1-a preference rating assigned by paragraph (C) (1) (i) or the A-1-c preference rating assigned by (C) (1) (ii) must communicate with the Office of Production Management, Washington, D. C., Ref: P-56, describing the material needed for emergency repair and the nature of the emergency, or the reasons why advance provision is necessary to avert break-down or suspension, and such other information as may be required. The Director of Priorities will notify such Operator whether, and to what extent, its application is approved, and a copy of such notification shall be furnished by the Operator to its Supplier to evidence the A-1-a or A-1-c rating.

(2) An Operator in order to apply the A-3 preference rating assigned by paragraph (C) (1) (iv) must communicate with the Office of Production Management, Washington, D. C., Ref: P-56, describing the machinery or equipment needed and the reasons why such machinery or equipment is essential for the proper operation of the Mining Enterprise. The Director of Priorities will notify such Operator whether, and to what extent, its application is approved and a copy of such notification shall be furnished by the Operator to its Supplier to evidence the A-3 rating.

(3) In acting on any application pursuant to paragraph (E) (1) or (2), the Director shall consider the importance to national defense of the material to be produced by the machinery, equipment, or other material for which rating is requested, and the consumption of scarce materials in the construction thereof.

(4) An Operator in order to apply the A-3 preference rating assigned by paragraph (C) (1) (iii), or a Supplier in order to apply the A-3 preference rating assigned by paragraph (C) (2) (i), or an Operator or a Supplier in order to apply any A-8 preference rating assigned by paragraph (C), must endorse the following statement on the original and all copies of the purchase order or contract for such material, signed by a responsible official duly designated for such purpose by such Operator or Supplier:

"Materials for a Mining Enterprise. Rating A- under Preference Rating Order P-56, Serial No. and in compliance therewith.

(Name of operator or supplier)

By.....
(Authorized signature)"

If the material is for export outside the limits of the United States, its territories and possessions, the Commonwealth of the Philippines, or the Dominion of Canada, such endorsement shall also contain the sentence:

"This material is for export and is covered by Export License No. dated" Such purchase order or contract so endorsed shall be delivered to the Supplier of such material. Such endorsement shall constitute a representation to the Office of Production Management and the Supplier with whom the purchase order or contract is placed that such purchase order or contract is duly and properly rated in accordance herewith. Such Supplier shall be entitled to rely on such representation, unless he knows or has reason to believe it to be false. Any such purchase order or contract shall be re-

KEEP 'EM HAULING—LONGER...

with ROEBLING Locomotive Reel Cable



DRAGGED across the mine floor, through muck and water—out to the room neck, back to the heading—reeled and unreeled countless times. No wonder moisture, abrasion and rough usage cause rapid wear of locomotive cables!

That's why you want the toughest, most resistant cables available. Study the construction of these Roebling Locomotive Reel Cables. Service in hundreds of mines proves that they have the staying qualities which keep breakdowns and replacements at a minimum.

RUBBER SHEATH

A rope laid conductor makes it extra flexible for easy reeling. The toughest kind of moisture resistant rubber sheath combines extra protection against impact and abrasion—with light weight. Sizes 1 to 4.

LOOM SHEATH

Where abrasion is not so severe, this cable offers adequate insulation and flexibility for many applications without the expense of

an all-rubber sheath. It is covered with a heavy circular loom cotton sheath, treated with moisture repellant compound. Sizes 1 to 8.



RUBBER SHEATH



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JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY

Branches in Principal Cities



for transmitting large powers continuously select DE LAVAL WORM GEARS

The case hardened steel worms, bearing-bronze wheels, and copious lubrication give long life, without requiring attention other than occasional checking of oil level. The efficiency is high, reaching 97 per cent for certain ratios, and does not recede, but rather improves, with use. The transmission of power is shockless and noiseless.

Our engineers gladly supply data and give competent advice for the solution of speed transformer problems. Ask for Leaflet W-1128

DE LAVAL WORM GEAR DIVISION
of the De Laval Steam Turbine Co., Trenton, N. J.

MANUFACTURERS OF TURBINES STEAM HYDRAULIC PUMPS CENTRIFUGAL PROPELLERS
ROTARY DISPLACEMENT MOTOR MOUNTED MIXED FLOW CLOGLESS SELF PRIMING
CENTRIFUGAL BLOWERS and COMPRESSORS GEARS WORM HELICAL and FLEXIBLE COUPLINGS

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Departmental Staff

McGRAW-HILL PUBLISHING CO., INC.

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Roll In the Barrels!

To aid in the conservation of steel for the American war program, Standard Oil Co. of Indiana is appealing to customers who receive lubricating oils and greases in steel barrels to return them as soon as they are empty so that all available barrels may be kept in circulation. Standard will inclose the appeal with statements or other mail to customers or have drivers distribute them. On steel barrels themselves a red, white and blue label will be applied reading: "Do your part—We will do ours. Return drums as soon as empty. Keep 'em rolling for defense!"

stricted to material the delivery of which is rated in accordance herewith. With respect to any purchase order or contract for such material placed before the effective date of this order, such preference rating may be applied by delivering to the seller a duplicate copy of such purchase order or contract so endorsed.

(5) An Operator or Supplier placing any such rated purchase order or contract, and the Supplier of the material covered thereby, must each retain endorsed copies of all such purchase orders or contracts, and copies of notification pursuant to paragraph (E), for a period of two years from the date thereof, for inspection by authorized representatives of the Office of Production Management.

(F) *Restrictions on Application of Rating.*

(1) The preference ratings hereby assigned shall not be applied

(i) unless the material to be delivered cannot be secured when required without such rating;

(ii) to obtain deliveries greater in quantity or on dates earlier than required for the operation, maintenance, or repair of the property or equipment used by an Operator in and essential to the operation of a Mining Enterprise;

(iii) by a Supplier to obtain material in excess of the amount necessary to make rated deliveries.

(G) *Restrictions on Inventory.*—No Operator shall accept deliveries (whether or not rated pursuant to this Order) of operating supplies or other material which will increase such Operator's inventory of such operating supplies or other material to an amount greater than the minimum necessary for the efficient operation of his business, and the ratio of inventory to current production shall in no event exceed the ratio of average inventory to average production for the years 1938, 1939, and 1940.

(H) *Resale of Operating Supplies and other Material Prohibited.*—Except with specific permission of the Director of Priorities, no Operator shall resell any operating supplies or other materials (whether or not obtained pursuant to rating assigned by this Order) except to another Operator.

(I) *Conservation and Standardization.*—Every person affected by this Order shall use his best efforts to effectuate conservation of materials by elimination, simplification, or standardization of types, sizes, or forms, or otherwise, and to cooperate in any program developed for such purpose by the Office of Production Management. The Director of Priorities may from time to time issue specific directions as to conservation, elimination, and standardization.

(J) *Relief.*—In case the productivity or sound working condition of any Mining Enterprise is adversely affected by any provision or application of this Order or by inability to obtain essential operating supplies or other materials, the person operating such Mining Enterprise may apply for relief to the Director of Priorities. The Director of Priorities may thereupon take such action as he deems appropriate.

(K) *Records, Audit, and Reports.*—Each Operator and each Supplier shall keep and preserve for a period of not less than two years accurate and complete records of all transactions affected by this Order and shall submit from time to time to audit and inspection by duly authorized representatives of the Office of Production Management. Each Operator and each Supplier shall execute

On the Job!



NOLAN ROTARY CAR DUMPERS

ON THE JOB—in modern mining operations in every important coal producing area throughout the United States! And Nolan Rotary Car Dumpers *stay on the job*—saving time, saving labor and saving coal—because they are right in principle, quick and positive in action and super-strong!

Nolan Rotary Car Dumpers are built for the toughest kind of hard service, and plenty of it. Without heavy shock or strain on car or dumper mechanism, and with a minimum of degradation to the coal, these sturdy, powerful dumpers handle their loads with clocklike precision, *sharply cutting production costs every hour they operate.*

3 CARS PER MINUTE--COUPLED OR UNCOUPLED

Nolan Rotary Dumpers make completely practical the use of rigid, solid-body mine cars. If desired, these powerful, dependable, easily controlled dumpers can be furnished to handle two cars or more at a time. For speed, safety and enduring service Nolan is emphatically the dumper to buy. Push button or master control lever makes it an easy, one-man job to handle the dumping operation. The dumper turns 360°, discharging all material cleanly and then stops automatically in upright position, safely locked by positive rail-aligning stop.

Write today for complete information on Car Dumpers of any type—for any operation; also Automatic Cagers, Feeders, Car Stops and other Mine Car Control Devices.

The NOLAN CREED

The name Nolan must always mean what it has always meant to mining men everywhere — complete dependability in mine car dumping and control devices.

THE MINING SAFETY DEVICE CO.,

BOWERSTON, OHIO

"BROWNIES"

(BOTH ABOVE GROUND and BELOW)

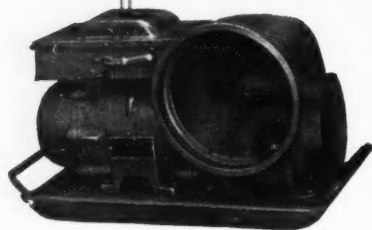


ARE SPEEDING

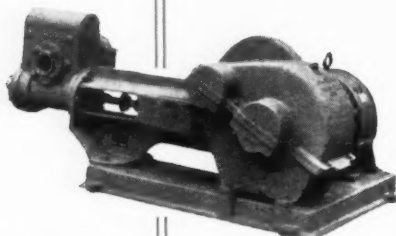
"PRODUCTION for

VICTORY"

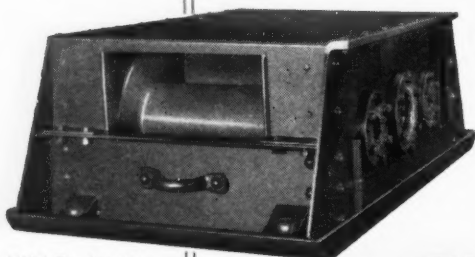
IN THE NATION'S MINES!



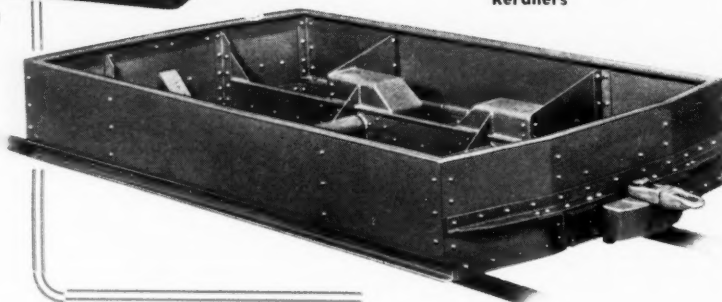
B C Tubing Blower



4 x 5 Gathering Pump



HKM Car Spotting Hoist



Maximum Capacity Mine Car

● Playing a major role in the nation's war effort are its coal mines . . . coal primarily provides the power that runs the tools that make the instruments of war.

Naturally, every effort to speed production, yet hold costs to a minimum, is being explored. In mines throughout the country you'll find BROWN-FAYRO equipment performing many operations economically, swiftly and safely.

Hoists, mine cars and wheels, pumps, tubing blowers, retarders, etc. . . all these "BROWNIES" are doing their share in achieving maximum "production for victory". And, they're eager to serve you . . . to demonstrate how a "BROWNIE" can do more work in less time, and last longer on the job.

Make it a point to investigate "BROWNIES" as applied to your operations. Write concerning these products which BROWN-FAYRO makes:—

Hoists—Room, Car Spotting, Layer Loading

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and file with the Office of Production Management or other designated agency, such reports and questionnaires as the Office of Production Management shall from time to time require. Until otherwise directed, each Operator shall file with the designated State agency on or before the 10th day of each month a report of purchases made during the preceding month pursuant to the ratings granted by this Order, and each Supplier furnishing machinery and equipment of the types specified in Schedule A hereto, or repair material therefor, shall file with the Office of Production Management or other designated agency on or before the 10th day of each month, beginning December 10, 1941, a report of deliveries and of purchases of such machinery, equipment, and materials made during the preceding month pursuant to the rating of A-3 or higher granted by this Order.

(L) *Violations.*—Any person affected by this Order who violates any of its provisions, or a provision of any other Order, regulation, or other directive of the Office of Production Management may be deprived of priorities assistance, or subjected to such other or further action as the Director of Priorities may deem appropriate.

(M) *Revocation or Modification.*—This Order may be revoked or modified by the Director of Priorities at any time as to any Operator or Supplier. In the event of revocation, or upon expiration of this Order, deliveries already rated pursuant to this Order shall be completed in accordance with said rating, unless the rating has been specifically revoked with respect thereto. No additional applications of this rating to any other deliveries shall thereafter be made by the Operator or Supplier affected by said revocation or expiration.

(N) *Amendment of Prior Order.*—The provisions of Preference Rating Order P-22 shall not apply to deliveries to which a preference rating is assigned by this Order.

(O) *Effective Date.*—This Order shall take effect immediately and shall continue in effect until revoked.

(P. D. Reg. 1, Aug. 27, 1941, 6 F. R. 4489; O. P. M. Reg. 3 amended Sept. 2, 1941, 6 F. R. 4865; E. O. 8629, Jan. 7, 1941, F. R. 191; E. O. 8875, Aug. 28, 1941, 6 F. R. 4483; sec. 2(a), Public. No. 671, 76th Cong., 3d sess., as amended by Public. No. 89, 77th Cong., 1st sess.; sec. 9, Public. No. 783, 76th Cong., 3d sess.)

Issued this 2d day of December 1941.

DONALD M. NELSON,
Director of Priorities.

SCHEDULE "A"

As to all machines listed below, the rating provided herein likewise applies to equipment items, accessories, and tools customarily sold with such machines:

Aerial tramway equipment
Air compressors for mine use
Air distribution equipment
Assaying and testing laboratory equipment at the mine
Ball-casting machines
Boxcar loaders
Cages and skips
Car dumpers—rotary or end
Cleaning plants and equipment, including design, construction, and erection
Concentrating plants and equipment, including design, construction, and erection
Conveyors—shaking, belt, or chain type, including duckbills and other self-loading heads
Cutting machines—cable reel and self-propelling transportation trucks therefor

Bureau of Mines Approvals

Three approvals of permissible equipment were issued by the U. S. Bureau of Mines in December, as follows:

Goodman Mfg. Co.—Type 360-CH loader; two motors, 50 and 7½ hp., 440 volts, a.c.; Approval 440-A; Dec. 6.

Jeffrey Mfg. Co.—Type 61-GW gathering conveyor; 10-hp. motor, 500 volts, d.c.; Approval 441-A; Dec. 24.

Jeffrey Mfg. Co.—Type 35-L-35 shortwall mining machine; 35-hp. motor, 250 and 500 volts, d.c.; Approvals 442 and 442-A; Dec. 30.

Diamond core drilling machines
 Dragline dredges, excavators, and scraper units
 Dredges—continuous bucket
 Drills and drilling machines, power driven, and reconditioning equipment therefor
 Dust control equipment
 Electrical equipment for mine transportation and power
 Hoists—including room hoists and car pullers
 Hydraulic monitors
 Jacks for lifting and roof support
 Lamps—mine, miners', safety, and ore-exploration types
 Locomotives for mine use
 Loaders, mobile, including mucking machines
 Milling plants and equipment, including design, construction, and erection
 Mine cars, track or trackless
 Pit-car loaders and elevating conveyors
 Preparation plants and equipment, including design, construction, and erection
 Pumps, pipe, and fittings for mine drainage or material transport
 Rock dusting equipment
 Sand dryers
 Scraper loaders
 Sheaves and sheave blocks
 Shovels, power
 Shuttle cars, track or trackless
 Slusher hoists and scrapers
 Storage batteries for mine use
 Tanks and bins for storage of mine products
 Tipples and head frames, including design, construction, and erection
 Track and track accessories for mine transportation
 Treating plants and equipment, including design, construction, and erection
 Trucks, tractors, and trailers for mine use
 Ventilation equipment
 Waste disposal equipment
 Weighing equipment, including automatic devices

AMENDMENT NO. 3 TO PREFERENCE RATING ORDER NO. P-56

(a) Schedule A to section 982.1 (Preference Rating Order P-56) is hereby amended as follows:

(1) "Conveyors—shaking, belt, or chain type, including duckbills and other self-loading heads" is amended to read, "Conveyors—shaking, belt, chain, or gravity type, including duckbills and other self-loading heads."

(2) "Dredges—continuous bucket" is amended to read, "Dredges—continuous bucket, including pumps."

(3) "Hydraulic monitors" is amended to read, "hydraulic monitors, with feed pipe and fittings."

(4) The following items are added:

(i) Safety and defense equipment
 (ii) Steel sections for support of mine openings
 (iii) Wire rope for haulage and hoisting

(b) This amendment shall take effect immediately.

(P. D. Reg. 1, Aug. 27, 1941, 6 F. R. 4489; O. P. M. Reg. 3 Amended, Sept. 2, 1941, 6 F. R. 4865; E. O. 8629, Jan. 7, 1941, 6 F. R. 191; E. O. 8875, Aug. 28, 1941, 6 F. R. 4483; Sec. 2(a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session; Sec. 9, Public No. 783, 76th Congress, Third Session.)

Issued this 31st day of December, 1941.

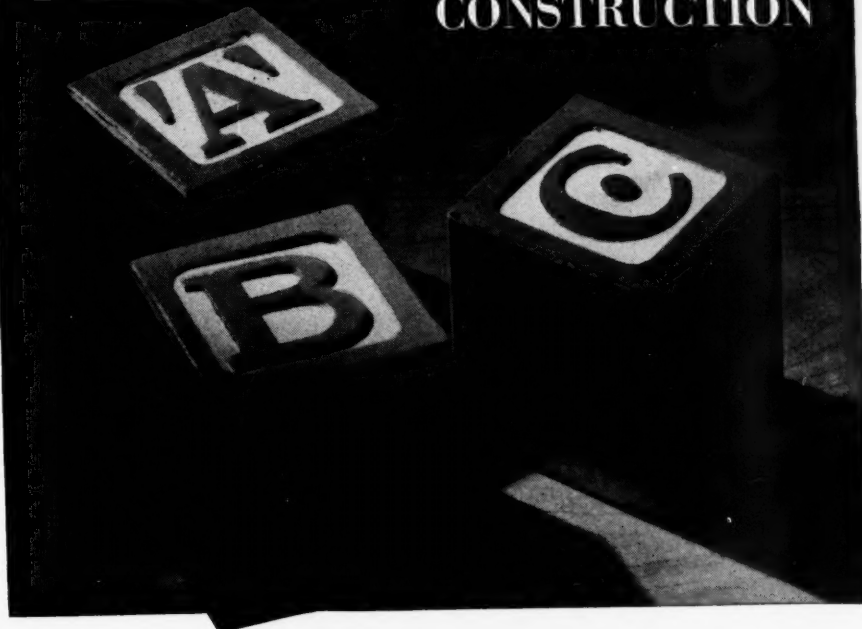
DONALD M. NELSON,
 Director of Priorities.

New Preparation Facilities

ALASKA RAILROAD, Esko Mine, Anchorage, Alaska—Contract closed with McNally-Pittsburg Mfg. Corporation for complete tipple and washery in which all coal is to be crushed to minus 2 in. and treated in a McNally-Norton automatic washer, with the minus 3/8-in. dried in a McNally-Carpenter centrifugal dryer; mine-run capacity, 25 t.p.h.; to be completed in September, 1942.

CONSOLIDATION COAL CO., Mine No. 93, Byrne, W. Va. — Contract closed with Kanawha Mfg. Co. for river loading plant consisting of alterations to existing equipment, including 48-in.-wide belt conveyor to river and barge loading arrangement, all housed in steel structure; capacity, 400 t.p.h.

ABC's OF THE TECO SYSTEM OF CONSTRUCTION



The TECO CONNECTOR SYSTEM IS

. . . a new method of structural engineering in timber that strengthens joints and permits lighter members to do work that formerly required heavier timber.

The TECO CONNECTOR SYSTEM HAS

. . . reduced man hours on the job by complete prefabrication of truss and frame assemblies.

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**TECO
CONNECTORS**

spread the load on
 a timber joint more
 equally over the cross-
 section of the wood.

Timber

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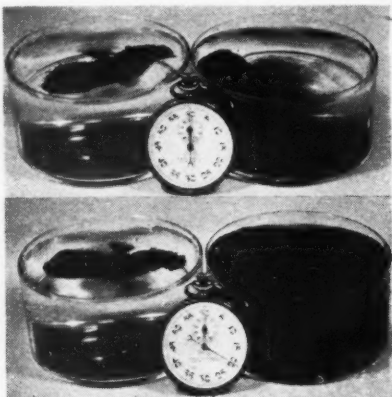
TIMBER ENGINEERING COMPANY, INC. Dept. BP-2,
 1337 Connecticut Avenue, Washington, D. C.

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MINE DUST CAN BE CONTROLLED by using COMPOUND M

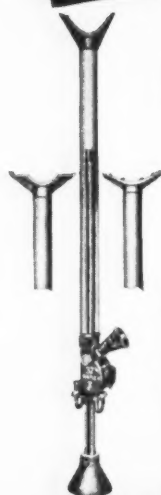
Plain Water Compound "M" Solution
Note: Stop watch started as coal dust was deposited



The leading mines of the country are standardizing on Compound M for dust control in the mine and tippie.

The Johnson-March Corp.
52 Vanderbilt Ave. New York

Ask for factual data.



Get Greater Tonnage!

The No. 32 Simplex Timber and Post Pulling Jack can increase the tonnage in your mine by

- Putting up cross timbers and beams faster.
- Straightening steel mine cars.
- Its use as a temporary mine prop.
- Taking up slack in power cable.
- Pulling and pushing conveyor lines.
- Controlling slack on tail piece.
- Pulling posts.

And by saving time on many other lifting, lowering, pushing and pulling jobs. Fast, safe double-socket ratchet lever—speedier than screw type jacks—full 5-ton capacity.

Get the complete facts on this and other Simplex Mine Jacks in Catalog 41.

Templeton, Kenly & Co.
Chicago, Ill.
California, Pa.
Princeton, W. Va.

Better, Safer Jacks Since 1899

Simplex Jacks

A better Jack for every job -
many jobs for every Jack

GULF MINING Co., Crab Orchard, W. Va.—Contract closed with Kanawha Mfg. Co. for Kanawha Belknap coal washer and conveying equipment to handle 40 t.p.h. of stove and nut coal.

C. H. MEAD COAL Co., East Gulf, W. Va.—Contract closed with Kanawha Mfg. Co. for preparation and cleaning equipment to handle coal from Nos. 2 and 6 mines consisting of conveying, screening and crushing machinery to prepare five grades and washing equipment for stove and nut sizes; equipment housed in steel structure; capacity, 600 t.p.h.

SEMET-SOLVAY Co., Smithers, W. Va.—Contract closed with Kanawha Mfg. Co. for complete Kanawha patented hillside slate dump.

WYATT COAL Co., Sharon, W. Va.—Contract closed with Kanawha Mfg. Co. for crushing and conveying equipment (housed in steel structure) for mixing and recirculating; capacity, 100 t.p.h. of lump and egg sizes.

Anthracite Survey Group Named

A seven-man Anthracite Survey Commission authorized by Congress to investigate ways and means of improving economic conditions in the hard-coal industry was completed on Jan. 13 when President Roosevelt named to the group Dr. R. R. Sayers, director of the U. S. Bureau of Mines; Ernest I. Lewis, director of the Bureau of Valuation, Interstate Commerce Commission, and Dr. Ralph J. Watkins, assistant director of the National Resources Planning Board.

Senate members already named were Senators Guffey (D.) and Davis (R.), of Pennsylvania, and Representatives Boland (D.) and Fenton (R.), also of Pennsylvania.

OPA Coal Advisers Named

To facilitate the work of the Office of Price Administration, a number of coal men were named to advisory positions in January by Leon Henderson. Irvin Davis, president, Hatfield-Campbell Creek Coal Co., who for the last several months has been working closely with retail dealers' associations for better cooperation and an improved retail-coal merchandising policy, was chosen a member of the Industry Council and a consultant on fuel distribution. Mr. Davis will be available for consultation on all types of fuel and particularly on retail distribution and selling practices.

Seven anthracite producers and one representative of the Commonwealth of Pennsylvania were named to an advisory panel for that industry, which will be called upon from time to time for technical information on price problems. Members of the panel are: C. F. Huber, chairman of the board, Glen Alden Coal Co.; James Prendergast, president, Susquehanna Collieries Co.; J. J. Tedesco, vice-president and sales manager, Pagnotti interests; J. B. Warriner, president, Lehigh Navigation Coal Co.; Donald Markle, president, Jeddo-Highland Coal Co.; R. E. Taggart, president, Philadelphia & Reading Coal & Iron Co.; James H. Pierce, president, East Bear Ridge Collieries Co.; and D. L. Corgan, secretary-treasurer, Governor's Emergency Committee of Pennsylvania.



Marion B. Walls

Miner Wins I.M.I. Scholarship

From coal mine to college classroom is the story of Marion B. Walls, of West Frankfort, Ill., winner of the first Illinois Mining Institute scholarship at the University of Illinois. He has just completed his first semester in the university.

Mr. Walls worked underground seven years in Orient No. 1 mine of the Chicago, Wilmington & Franklin Coal Co. He was employed in the mine from 1934, when he was graduated from the West Frankfort community high school, until last autumn, when he started to study mining engineering at the university.

The scholarship provides \$100 a year for four years. Other four-year scholarships will be awarded annually to Illinois residents who have been active miners or are sons of Illinois miners. The purpose of the scholarships is to promote the training of worthy, qualified young men for careers in the Illinois coal industry.

U.M.V. Forms Promotion Division

A coal research department to assist operators in the sale of their product has been formed by the Upper Monongahela Valley Association. Vice Chairman W. E. Brooks announced on Jan. 13 that the plan was approved at a meeting of the board of directors and members of the ten-county organization. The department, he said, will act as a directing agent and coordinator in the promotion of northern West Virginia coal. It also will promote the use of equipment best suited to the firing of coal produced in the region.

To Make Utah Coal Smokeless

A company to be known as the Coal Logs Co. was organized and incorporated late in December with headquarters in Salt Lake City, Utah, to produce smokeless fuel from Utah coals. K. L. Storrs is president and George W. Carter, engineer. Governor Herbert B. Maw has instructed the State Department of Publicity and Development to

1
THE INCANDESCENT
LAMP

2
THE STEEL-ALKALINE
BATTERY



TWO GREAT EDISON INVENTIONS

are required to provide the world's finest
miner's electric cap lamp

One of Mr. Edison's epochal inventions is used wherever electric light shines underground . . . but *two* are needed for perfection in modern electric cap lamp safety, dependability and service! Back of the unparalleled illumination of the Edison Lamp is the unfailing power and strength of the Edison steel-alkaline battery . . . providing years of



trouble-free performance not remotely approached by any other type of construction, *and exclusively Edison.*

Two great inventions. Two great reasons for the dominant popularity of the Edison Electric Cap Lamp in progressive mines everywhere. May we arrange a complete demonstration?



MINE SAFETY APPLIANCES COMPANY

BRADDOCK, THOMAS AND MEADE STREETS, PITTSBURGH, PA. . . DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

M. S. A. Products Include: Breathing Apparatus . . . Inhalators . . . Approved Dust Respirators . . . Masks of all types . . . Gas Indicators . . . Gas Detectors . . . Safety Goggles . . . Protective Hats and Caps . . . Edison Electric Cap Lamps . . . Safety Belts . . . Safety Clothing . . . Dust Instruments . . . First Aid Equipment. Descriptive Bulletins will be sent on request.



Why continue to cut and bow wire rope, weakening the strands, making serious accident possible?

Use the Safety Clip. It can't be put on wrong — inexperienced workers can't cause the dangers of the U-Bolt put on backward. The Safety Clip takes a powerful, all-round Fist-Grip on rope. The four flat bearing surfaces far out-hold the finger-pinching U-Bolt Clip, and cannot crush and crimp wire rope.

The Safety Clip Gives More Steel for Armaments!

25% less steel is used in a Safety Clip assembly equal in strength to a U-Bolt-held rope. That steel can go to arsenals and plane factories for all-out military needs. Fewer clips are needed — that saves steel, too. And the rope-ends stay straight and round for re-use — no expensive waste from cut-off crimped-up rope ends.

THESE ARE YOUR SAFETY SAVINGS

No rope crimping or bowing.....	rope saved
No special wrench.....	tools saved
Bolts on opposite sides.....	tightening time saved
Can't go on wrong.....	accidents saved
Fewer clips needed.....	clips saved
Fewer rope breaks.....	accidents saved
No bent, battered threads.....	clips saved

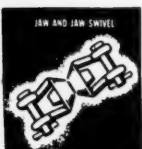
95% rope strength delivered by test.

Distributed exclusively through Mill Supply Houses

Look for Laughlin Products in Coal Mining Catalog.



THE THOMAS **LAUGHLIN** COMPANY
PORTLAND, MAINE



aid the new concern in obtaining material for construction of its plant, which it is hoped will be ready and in operation at an early date.

The production of smokeless coal has been considered by different Utah interests for more than a decade, but so far no project has actually reached the commercial production stage. The growing sensitiveness to smoke in the cities of the State and the importance of conserving natural resources because of the war emergency are factors which it is hoped will make the venture a success. It is pointed out that vast quantities of fuel are wasted each year by burning Utah coals in their raw state.

Island Creek Buys Control Of Thacker Coal Co.

Island Creek Coal Co. has increased its coal reserves to a substantial extent by purchasing control of the Thacker Coal Co. According to James D. Francis, president of Island Creek, more than 90 per cent of Thacker capital stock has been acquired for "about \$1,400,000."

The Thacker company, a land-holding and owning corporation, has 22,000 acres in Mingo County but has not operated any of it, and Mr. Francis did not expect to do so either in the near future. Part of the acreage, however, has been leased by the Thacker company to independent operators including the following: Puritan Coal Corporation, Lando Coal Co., and the estate of Dan Pritchard. These companies, it is said, will continue to operate the leases, although control of the holdings has been transferred.

West Pennsylvania Strike Fines Refunded to Miners

Refunding of an estimated \$45,000 to 15,000 miners in the western Pennsylvania coal field began shortly after Jan. 15. The money represents dollar-a-day fines imposed on commercial miners by operators under a clause in the contract with the United Mine Workers providing for punitive action in the case of an illegal strike. Byron Canon, secretary of the Western Pennsylvania Coal Operators' Association, announced on Jan. 4 that the money would be returned, following negotiations between the association and union representatives of districts 3, 4 and 5.

The commercial operators contended that the miners were not justified in calling sympathy strikes last November in support of the captive miners' demands for a union shop in mines owned and operated by steel companies in producing coal for their own use. The union asserted that the fines should be repaid under a protective clause in their contract.

Southern West Virginia miners also requested that strike fines be remitted.

Penwell Mine Leased

Penwell mine of the Penwell Coal Mining Co., Pana, Ill., has been leased for five years to local promoters, known as the Pana Coal Co., of which Harry Tanner is president. Closed since last April, the operation is to be reopened immediately.

"With **GULF QUALITY LUBRICANTS**

we keep Coal Output UP Costs down"

— says this Mine Superintendent



**"By following Gulf Engineering
Recommendations we get
dependable efficient performance
from all our equipment"**

BETTER lubrication with Gulf oils and greases is one outstanding reason for our long record of *high-output, low-cost* operation," says this Mine Superintendent. "These quality lubricants provide the kind of protection that enables us to get full capacity production from our equipment day in and day out—and with minimum expense for maintenance."

The *production value* of Gulf quality lubricants shows up more than ever today—when every possible effort is being made to increase production to meet war-time

demands. For severe service proves the remarkable stability and endurance of these lubricants—they stand up and give *full protection* under continuous peak load conditions—conditions which often cause breakdowns or disruptions in production schedules. Result: *More output* from Gulf lubricated equipment.

The Gulf line of more than 400 quality oils and greases is quickly available to you from 1200 warehouses in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

**GULF OIL CORPORATION
GULF REFINING COMPANY**



**GULF BUILDING
PITTSBURGH, PA.**

"I use C.M.C. Extensively"

... Says Mr. John M. Weed, Superintendent of McAlester Fuel Company's Sandow Mine at Rockdale, Texas.

Note this "Roll Call" of Catalogers

The 1941 COAL MINING CATALOGS had 40% more BUYING information than the 1940 Edition. These companies are giving Mining Men the added buying information they request.

SECTION I—PROSPECTING, EXPLORATION, DEVELOPMENT, ENGINEERING OFFICE EQUIPMENT

Dravo Corp.
Hoffman Bros. Drilling Co.
Johnson Co., R. G.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

SECTION II—CUTTING, DRILLING, SHOOTING AND STRIPPING

Black & Decker Mfg. Co.
Bowditch Co.
Central Mine Equipment Co.
Chicago Pneumatic Tool Co.
Cincinnati Electrical Tool Co.
Cincinnati Mine Machinery Co.
Dooley Bros.
du Pont de Nemours & Co., E. I.
Ingersoll-Rand Co.
Jeffrey Mfg. Co.
National Powder Co.
Salem Tool Co.
Schramm, Inc.
Sullivan Machinery Co.

SECTION III—LOADING, TRANSPORTATION, DUMPING, HOISTING

American Cable Div., Amer. Chain & Cable Co.
American Mine Door Co.
American Steel & Wire Co.
Atlas Car & Mfg. Co.
Bethlehem Steel Co.
Barber-Greene Co.
Brown-Fayro Co.
Carnegie-Illinois Steel Corp.
Connellsville Mfg. & Mine Supply Co.
Edison Storage Battery Div. of Thomas A. Edison, Inc.
Enterprise Wheel & Car Corp.
Electric Storage Battery Co.
Fridy Hoist & Machinery Co.
Hazard Wire Rope Div., Amer. Chain & Cable Co.
Indiana Foundry Co.
Interstate Equipment Co.
Irwin Foundry & Mine Car Co.
Jeffrey Manufacturing Co.
Joy Manufacturing Co.
Kanawha Manufacturing Co.
La-Del Conveyor & Mfg. Co.
Leschen & Sons Rope Co., A.
Lidgerwood Mfg. Co.
Lobdell Car Wheel Co.
MacWhyte Co.
Metal & Thermit Corp.
Mining Safety Device Co.
Myers-Whealey Co.
Norma-Hoffmann Bearings Corp.
National Malleable & Steel Castings Co.
Penn Machine Co.
Parkersburg Rig & Reel Co.
Pittsburgh Knife & Forge Co.
Pressed Steel Car Co.
Roebbling's Sons Co., John A.

SECTION IV—TIMBERING VENTILATION AND MINE DRAINAGE

American Hard Rubber Co.
American Brattice Cloth Co.
Barrett, Haentjens & Co.
Brown-Fayro Co.
Carbolineum Wood Preserving Co.
Deming Co.
Duff-Norton Mfg. Co.
du Pont de Nemours & Co., E. I. (Fabrikoid Div.)
Flocker & Co., John
Frederick Iron & Steel Co.
Gorman-Rupp Co.
Goyno Steam Pump Co.
Jeffrey Mfg. Co.
LaBour Co.
Markham Products Co.
Wyckoff & Sons Co., A.

SECTION V—PREPARATION

Abbe Engineering Co.

Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bixby-Zimmer Engineering Co.
Brown-Fayro Co.
Centrifugal & Mechanical Industries
Deister Concentrator Co.
Deister Machine Co.
du Pont de Nemours & Co., E. I. (R&H Chemicals Dept.)
Dings Magnetic Separator Co.
Fairmont Machinery Co.
Jeffrey Mfg. Co.
Kanawha Mfg. Co.
Koppers Co.
McLanahan Stone Corp.
Merrick Scale Mfg. Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Screen Equipment Co.
Tyler Co., W. S.
Universal Vibrating Screen Co.
Viking Mfg. Co.
Wedge Wire Corp.

SECTION VI—POWER (GENERATION AND DISTRIBUTION)

Babcock & Wilcox Co.
Caldwell Co., W. E.
Falk Corp.
Garlock Packing Co.
General Electric Co.
Hazard Insulated Wire Works
Keystone Carbon Co.
Mines Equipment Co.
Ohio Carbon Co.
Rockbestos Products Corp.
Spray Engineering Co.
Superior Carbon Products, Inc.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machinery Corp.

SECTION VII—SUPPLIES, MAINTENANCE, SAFETY, CONSTRUCTION

Atlantic Refining Co.
Black Diamond Spad Co.
Bristol Co.
Duraloy Co.
Edelblute Mfg. Co.
Gibraltar Equipment & Mfg. Co.
Hauck Mfg. Co.
Hauser-Stander Tank Co.
Johns-Manville
Jones & Laughlin Steel Co.
Laughlin Co., Thomas
Mica Insulator Co.
Ruberoid Co.
Shawinigan Products Corp.



Now . . .

More than ever before—you need access to

COAL MINING CATALOGS!

With every effort bent towards VICTORY, greater production and more efficient use of men and machines, speed-up of purchasing is highly important. A high priority rating insures mining men the equipment and materials they need. COAL MINING CATALOGS' 1941 Edition—in new sectionalized form, and with 40% more catalog information—is one handy reference, simplifies and speeds your buying!

WE'LL GLADLY SEND YOU A COPY . . . if you are responsible for the specifying, requisitioning, or buying at your machinized property, and you haven't received your copy of the new 1941 Edition of C.M.C., write us on your letterhead telling us about your property. We'll shoot you a copy right away!

WHEN YOU'RE BUYING . . . Look for it first in COAL MINING CATALOGS!

OPA Urges No Price Rise

Following reports of increases in retail coal prices in several localities Leon Henderson, Administrator of the Office of Price Administration, requested dealers of the country on Jan. 18 not to increase prices above those which they individually charged for different grades and sizes in the period between Dec. 15 and 31, 1941.

Retail dealers in Washington, D. C., and vicinity, in response to the Henderson request, voluntarily reduced prices 25c. per ton on all grades of coal and coke effective Jan. 23, the OPA organization announced. This reduction restored prices to the level of Jan. 16, OPA, it also was announced, would immediately study costs and margins to determine whether or not an increase in prices is justified at this time.

Industrial Notes

OHIO BRASS CO., Mansfield, Ohio, has appointed T. J. ("Jeff") Harris as district sales manager in the Kentucky, Tennessee and Virginia territory formerly handled by the late Ward Brannon, with headquarters at Middlesboro, Ky.

WESTINGHOUSE ELECTRIC & MFG. CO. has moved the locomotive tire welding section of its St. Louis service shop to West Frankfort, Ill. Two reasons induced the move: lack of room at St. Louis and the fact that most of the tire retreading comes from the West Frankfort area.

STEWART-WARNER CO., Chicago, has elected two new vice presidents, Joseph C. Elliff and George L. Meyer. Mr. Elliff will continue to serve as assistant general sales manager. Mr. Meyer will continue in charge of the die-casting plant.

WORTHINGTON PUMP & MACHINERY CORPORATION, Harrison, N. J., has appointed George P. Passmore as works manager in charge of manufacturing of its Wellsville (N. Y.) plant.

COPPERWELD STEEL CO. announces that the address of its Chicago district office now is 122 South Michigan Ave. R. S. Clingan is district manager.

TIMKEN ROLLER BEARING CO., Canton, Ohio, has appointed Dwight A. Bessemer as assistant director of purchases. F. H. Lindus has been transferred to sales promotion work at Canton, Ohio.

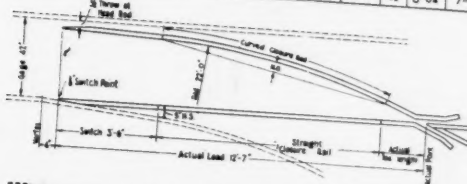
McKENNA METALS CO. announces that W. L. Kennicott, previously Los Angeles sales manager of the company, is now at the head office and factory at Latrobe, Pa., in the management of sales and engineering of Kennametal tools and their application in industry.

PENNSYLVANIA DRILLING CO., Pittsburgh, Pa., has reelected T. B. Sturges as president. Other officers named are: vice president, F. C. Sturges; treasurer, John H. Melvin.

JOHN A. ROEBLING'S SONS CO., Trenton, N. J., has appointed Bert M. Brock as manager of industrial relations. For the last year he has been director of industrial relations, Pittsburgh district, Carnegie Illinois

WEST VIRGINIA TRACK EQUIPMENT IS GOOD..

FROG				SWITCH				ACTUAL				CLOSURE DIMS			
NO.	ANGLE	TYPE	DRILL	POINT	LENGTH	ANNUAL	POINT	LEAD	LEAD	LEAD	LEAD	CLOSURE	NO.	LENGTH	ANNUAL
2	25°00'	ST	20" x 40"	4"	3'-6"	16'-10"	8"	5' 4"	12'-7"	22'-0"	56"	9'-15"	5'-6"		
		ST	20" x 30"	4"	3'-6"	16'-10"	8"	5' 4"	12'-7"	22'-0"	56"	9'-15"	5'-6"		
		ST	40"	8"	20"	3'-6"	16'-10"	8"	5' 4"	12'-7"	22'-0"	44"	8'-34"	7'-8"	
		ST		8"	20"	3'-6"	16'-10"	8"	5' 4"	12'-7"	22'-0"	44"	8'-34"	7'-8"	



With coal such a vital cog in our victory plan, nothing should be allowed to retard its production. Yet there are mines that have a bottleneck in their mine tracks. Such a bottleneck can work havoc with increased production schedules. We recommend these steps as an important aid in securing trouble-free haulageways.

1. Ask for West Virginia recommendations as applied to your conditions and required service.
2. Purchase West Virginia track equipment.
3. Install it as recommended and in accordance with American Mining Congress Standards.
4. Give the tracks proper maintenance.

... and correct installation makes it even better!

Modern mining demands the best materials, workmanship and design in track work. West Virginia builds high grade, modern track work and their Engineers are glad to give you obligation free consultation service.

Everything in Trackwork

THE WEST VIRGINIA RAIL CO.
HUNTINGTON  WEST VIRGINIA

Super Duty
DIAGONAL DECK

**No. 7
COAL WASHING
TABLE**



*Enjoys
Unprecedented
Field Acceptance*

The imposing and ever increasing list of Super-Duty table placements, substantiating leadership, is convincing proof that this is your profit process for that coal cleaning job.

Check the performance and modern features of this table in the field. Installation list furnished on request.

THE DEISTER CONCENTRATOR COMPANY

The Original Deister Co., Incorporated 1906
909 Glasgow Ave. Ft. Wayne, Ind., U. S. A.

ABC JUTE BRATTICE CLOTH



*therefore you are assured
well ventilated*

WORKING PLACES

Leakage of air is kept at a minimum with ABC Jute because this cloth is woven from heavy yarns, loomed skillfully and uniformly throughout.

ABC Jute Brattice Cloth is specially treated to resist corrosive conditions and to reduce air friction—four grades from which to choose to properly fill your needs give **POSITIVE ASSURANCE** against such destructive forces as flame and fungi. Also, even though your mine has unusual moisture, it will not cause shrinkage of ABC Jute.

Our many years of experience are at your disposal. Investigate ABC Jute Brattice Cloth now when dependability of performance in all equipment is so very important.

AMERICAN BRATTICE CLOTH CORPORATION

WARSAW, INDIANA

Agencies in all Mining Centers

Steel Corporation, and prior to that was assistant director of industrial relations for the United States Steel Corporation, Pittsburgh.

MINE SAFETY APPLIANCES CO. OF CANADA, LTD., has acquired a new building at 139 Kendal Ave., Toronto, where a broad line of approved safety equipment will be available. This subsidiary will manufacture and assemble certain M.S.A. products while stocking all important items made by the parent company. The Canadian general manager, R. Morris, will have his headquarters in Toronto.

RAYBESTOS-MANHATTAN, INC., Passaic, N. J., has appointed F. L. Curtis, general manager of the Manhattan Rubber Mfg. Division, as vice president of Raybestos-Manhattan, Inc. Associated with the company since its beginning in 1893, he will continue as treasurer of Raybestos-Manhattan, Inc. H. E. Smith, assistant general manager of the Manhattan division, succeeds Mr. Curtis as general manager. J. H. Matthews, assistant factory manager, is now assistant general manager.

JENKINS BROS., New York City, announces that it has materially increased productive capacity of corrosion-resisting alloy valves. The line of globe, angle, Y and check valves has been augmented by solid-wedge and double-disk-taper seat gates in sizes to 6-in. Another innovation is "Certified Castings," each being X-rayed as well as pressure-tested.

WICKWIRE SPENCER STEEL CO. has elected Dean Rollans as vice president in charge of sales and has appointed William H. Husted as assistant to the president.

CHICAGO PNEUMATIC TOOL CO., New York City, has appointed J. Rogers Davis as supervisor of branches, a newly created office. He joined the company in December and will assist in the sales activities of its 21 district and subdistrict offices, standardizing sales office procedure and coordinating sales plans and quotas with branch and division managers.

B. F. GOODRICH CO., Akron, Ohio, has named William S. Richardson as general manager of mechanical goods and sundries sales, succeeding J. H. Connors, who resigned because of ill health. Dr. Howard F. Fritz, manager of the synthetics division for the last seven years, has been made director of research.

ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., has elected Max W. Babb, president of the company, as chairman of the board of directors, and W. C. Buchanan, a director and member of the executive committee, has been elected to succeed him as president. Mr. Buchanan has for the last six years devoted a substantial part of his time to the Globe Steel Tubes Co., of which he is president, and in which capacity he will continue.

FALK CORPORATION, Milwaukee, Wis., has appointed Ralph H. Deihl to the position of advertising manager.

JOY MFG. CO. announces that it has purchased all the shuttle-car patents and the entire shuttle-car business of the Lee-Norse Co. Manufacture of this equipment will be continued and will be offered direct to customers by the Joy sales organization. Cus-

tomers of the Lee-Norse Co. are assured of continued spare-part and repair service direct from Charleroi, Pa., for the present, but all orders for new equipment will be handled through the Joy Mfg. Co., Franklin, Pa.

Coal-Show Program Revised For Better War Planning

To make convention papers and discussion yield the maximum value in the new and critical problems facing the coal industry as a result of the war effort, the program for the 1942 coal show of the American Mining Congress, to be held at the Music Hall, Cincinnati, Ohio, April 27-May 1, was materially revised at a special meeting of the program committee headed by J. Noble Snider, at Pittsburgh, Jan. 16. As a result of this meeting, the general and deep-mine program now stands as follows:

Maximum Production From Mechanical Loading—Track-mounted loaders and mine cars; tractor loaders and shuttle cars; conveyor mechanical mining; belt conveyors and multiple units.

General Operations—Ventilation (sealing mine areas, improved ventilating methods); roof support (effect on production, causes and prevention of falls); face operations (cutting, drilling, blasting).

Equipment Maintenance—Maintenance methods (rebuilding machinery, substitute materials); conservation of materials (centralization of supplies, salvage, recovery and related subjects).

Coal Preparation—War-time methods (maintaining quality standards, reducing number of screened sizes); coal-drying methods and other auxiliary preparation questions.

Safety—Handling and distributing explosives underground; allaying dust in cutting, loading and transporting coal.

Management and Personnel—War-time problems (absenteeism, replacements, "slack-ing," transferring).

National War-Time Problems—Priorities on mining equipment, by Dr. Wilbur A. Nelson, administrator; salvage of scrap metals, by George T. Weymouth, chief, industrial salvage section, WPB; coal distribution and production; prevention of espionage and sabotage, by E. P. Coffey, FBI.

Two strip-mine sessions are included in the program. Subjects proposed by the strip-mine section of the program committee, at a meeting in Chicago, Dec. 12, include drag-line operations, alone or in tandem with shovels; power distribution and protective power devices; drift mining from strip pits; shovel-tooth design and maintenance; and a symposium on developments in the West-Central, Indiana-Illinois and Ohio strip-mining fields.

To Reopen Bessie Mine

Plans are under way by the Sloss-Sheffield Steel & Iron Co. to recondition and reopen its Bessie mine, Maben, Ala., which has been closed since October, 1931. This is a slope operation on the Mary Lee seam. The coal produced—1,500 to 2,000 tons daily—will be coked by the company at its blast furnaces. About 300 men are to be employed.

KOPPEL ALL STEEL MINE CARS BIGGER PAY LOADS QUICK CLEAN DUMPING ACTION



Koppel All-Steel Mine Cars are especially designed to give long, economical service and easy handling in coal mine service. Designs include end dump and rotary dump in high-capacity, low-height types; also in 12 to 50 cu. yd. automatic air dump cars for open pit service. Write for bulletins 66 and 71 or send us your inquiry.



KOPPEL



PRESSED STEEL CAR COMPANY, INC.
(KOPPEL DIVISION)
PITTSBURGH, PA.

PARAGON The Original ALL RUBBER SHOT FIRE CABLE

PARAGON All-Rubber Shot Fire Cable was designed by a practical mine operator for the sole purpose of making the electric firing of coal mine blasts safer, surer and more economical. He made it—

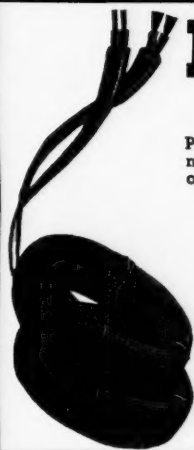
LIGHT and easy to handle
STRONG, to pull out from under tons of coal
TOUGH, to withstand sharp rock blows
INSULATED with double rubber vulcanized on the soft flexible copper conductors to prevent shorts.

Altogether, PARAGON ALL RUBBER SHOT FIRE CABLE is the most practical obtainable, at any price. And the men like it, too because of the ease of handling. Write for prices in coils of any desired length with either solid or stranded copper conductors.

Paragon Electric Co.

37 W. VAN BUREN ST.

CHICAGO



A QUICK READING OF THESE QUESTIONS AND ANSWERS MAY SAVE YOU HUNDREDS OF DOLLARS

Why is it important to keep voltage up at the face?

1. Machinery operates at high efficiency at maximum voltage.
2. Low voltage means high amperage, increased power costs and decreased efficiency.
3. Low voltage "roasts" or burns out armature windings on equipment.

What is one way to keep voltage up at the face?

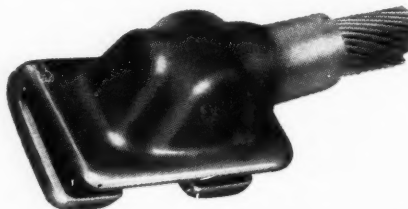
An efficient bonding system is the ONE MOST IMPORTANT factor in keeping power up at the face.

● If you feel that you are not getting everything possible out of your power system it will pay you to investigate Mosebach Flashweld Rail Bonds. Manufactured by the patented Flashweld Process, which makes a better, more oxygen-free connection between cables and terminals, these bonds can cut power losses to a minimum. There are 16 styles of Flashwelds—one to meet every bonding requirement. Send today for your copy of the new bulletin which illustrates all 16 styles.

Write for information on the Mosebach Bond Tester and Voltmeter, the compact instrument which enables you to test rail bond efficiency and voltage losses.



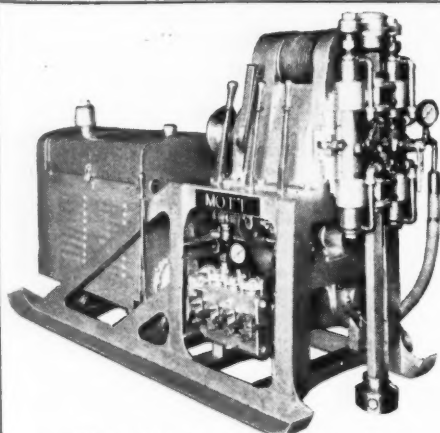
TYPE M5-T—for use on top of any size rail base. Outer ledge of terminal gives extra welding area, makes welding easier and faster.



TYPE M8-F—large welding area for permanent installation. For temporary use this bond can be welded on ends of lugs, easily removed and re-used many times.

MOSEBACH

ELECTRIC & SUPPLY COMPANY
1115 Arlington Avenue Pittsburgh, Pa.



1500' - 2 1/4" Core — Oil Hydraulic

DIAMOND CORE DRILLING

CONTRACTORS

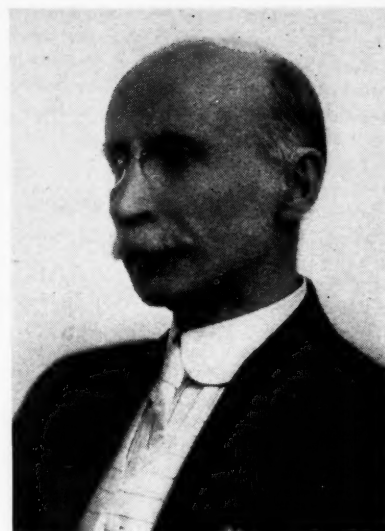
Specializing in Testing Coal Properties.
We Guarantee Satisfactory and
"PROPER COAL CORES"

Inside Mine Drilling

Pre-Grouting for Mine Shafts

Wells and Discharge Holes
Drilled and Grouted.

MOTT CORE DRILLING CO.
Huntington, W. Va.



James T. Beard

James T. Beard Passes On With Christmastide

James Thom Beard, former associate editor of *Coal Age*, founder of the Mine Inspectors' Institute of America and author of many books on mining matters, passed away at Danbury, Conn., the morning of the day after Christmas at the age of 86.

Born in Brooklyn, N. Y., he attended the Adelphi Academy in that city, finishing his education at Columbia University, New York, where he received the degrees of civil engineer and engineer of mines, becoming an assistant engineer in the construction of the Brooklyn Bridge. His next position was as an assistant engineer for Brooklyn in 1880. He also taught science and English at the DeKalb Academy in that city.

In that same year, he became a division engineer for the Chicago, Burlington & Quincy R.R., serving later as superintendent of the Smoky Hollow Coal Co. in Iowa. From 1883 to 1885 he was deputy mine surveyor at Aspen, Colo. When this work was completed, he returned to Iowa and was mining engineer in charge of mine development and construction work for the Ottumwa Fuel Co., Ottumwa, Iowa.

Some time later, he was appointed secretary and engineer of the first State Board of Examiners for Mine Inspectors, at Des Moines, Iowa, and then he managed the Iowa Mining Exchange, giving up this work in 1896 to become principal of the School of Coal Mining, International Correspondence Schools, in Scranton, Pa. He continued with this organization for 16 years, acting at the same time as associate editor of the publication known at times as *Colliery Engineer* and *Mines and Minerals*. Late in October, 1911, soon after *Coal Age* published its first issue (Oct. 14, 1911), Mr. Beard came to New York as an associate editor, editing the departments "Discussion by Readers," "Inquiries of General Interest" and "Examination Questions." Later, with advancing years, he made his home at Danbury and sent or brought his weekly contribution to New York. His resignation as associate editor occurred late in November, 1923.

One of the outstanding acts in his career was the founding of the Mine Inspectors'

Institute of America in 1938—an organization which has expanded greatly with the years. He invented the Beard-Mackie sight indicator for detecting and measuring methane percentages by the glowing of the platinum rungs of a ladder placed over the flame, which marked clearly the height to which the flame extended. His invention also was the Beard-Stine centrifugal mine fan. He was the author of the following books: "Ventilation of Mines," "Mine Gases and Explosions," "Design of Centrifugal Ventilators," "Blasting Manual" and "Detection of Small Percentages of Gas by the Safety Lamp." But most noteworthy of his books must be rated "Mine Examination Questions and Answers," which for a generation those contemplating mine foremanship or a position of mine examiner have studied industriously.

Surviving are his wife, Mrs. A. L. Beard, and three children, Mrs. W. E. Macauley, Howard I. Beard and James T. Beard, Jr.

Obituary

J. T. SMITH, 64, mine manager for the New Orient mine of the Chicago, Wilmington & Franklin Coal Co., West Frankfort, Ill., died

Jan. 6. He had been with the company for 36 years.

LLOYD J. SPEED, 42, president of the Black Star Coal Corporation and the Pioneer Coal Co., operating in Bell and Harlan counties, Kentucky, respectively, died of a heart attack Jan. 11 in Louisville.

C. M. MOORE, 67, president of the Moore Coal Co. and the Clinchmore Mining Co., with headquarters at Knoxville, Tenn., died suddenly Jan. 7. He had been active in the bituminous coal industry for more than 50 years.

W. A. ELLISON, 49, president of the Mahan-Ellison Coal Corporation and the Southern Harlan Coal Co., operating in Harlan County, Kentucky, died Jan. 16 at his home in Knoxville, Tenn. He had been ailing since about Christmas.

To Operate Duvin Mines

The Low Moisture Coal Co. has arranged to operate the mines of the former Duvin Coal Co., Providence, Ky. According to an announcement on Jan. 10, 25 men were employed to clean up and handle salvage work, after which 100 men were to be taken on.

LETTERS

To the Editor

In this national emergency, when our nation is confronted with one of the greatest dangers in its history and when all our citizens are anxious to do their bit with money, labor, property or in any way they can help, there is one thing that must not be overlooked and that is safety in industry, especially in coal mining. At this time safety has a much greater meaning than at any time before, for we will not only be saving human suffering and monetary cost but we will be helping keep men in the army and navy as well as keeping coal in the nation's bin.

There is bound to be a shortage of labor, for the government will surely call for men from all industries to man our ships and increase our army. Therefore it is up to men who mine the coal to see that there is a much less loss of time by accidents in mining so that the men who are not needed to fight this war can be kept at work and thereby fill in for the men who are called to fight. The Japs are going to do all they can by fair means or foul, and they have used foul means up to now, to kill, cripple, capture or put out of commission any American subject that they can, so if we have an accident in our mines we not only lose the labor of the person or persons injured or killed but we do the dirty work for our enemy—that is, we save them the job.

We were horrified when we heard about the loss of life at Pearl Harbor, yet in only a few months we have as many fatalities in coal mines, and if none of the men are close to us we think nothing of it. As the records now stand on the rate of casualties for past wars, taking into account the number of

men in action in our armed forces and men in our mines, the dangers are about equal.

Now to get down to brass tacks: mine accidents can be cut more than half if all men who are engaged in mining will make an honest effort to work safely and see that the other fellow works safely. This safety drive will have to start at the top and will have to be supported by every man at each mine. The manager should see that a safety program is put in action and he should take part; just telling someone to start a safety drive is not enough. He can accomplish more by being up to his neck in safety and showing it than any man in his organization. By constantly practicing and teaching safety, the superintendent, mine foreman, safety engineer, assistant foreman and safety committee can cut their accidents in half.

Every mine should have safety clubs. All of the officials should attend and every effort should be made to have all the employees attend. And in these safety meetings the very first rule should be that only safety is to be discussed. There is nothing so disastrous to safety as bringing up an argument not pertaining to safety at a safety meeting. Attendance can be helped by various means, but one of the best is giving prizes to holders of lucky numbers.

As the old saying goes, now is the time for all good miners to come to the aid of our country.

WALTER HORNSBY

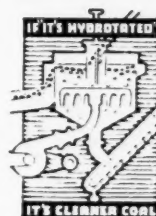
District Inspector

Kentucky Department of Mines and Minerals, Pikeville, Ky.

Dec. 22, 1941.

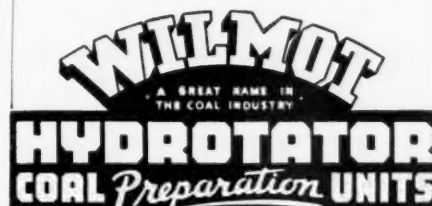


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5 NEW ANTHRACITE PREPARATION PLANTS COMPLETED IN 1941

The Hydrotated Anthracite Coal Company Breaker (pictured above) with Hydrotator units for steam sizes and Chance Cons for domestic sizes, is typical of the modern-type anthracite preparation plants, designed, built and equipped by Wilmot Engineering Co., Hazleton, Pa.



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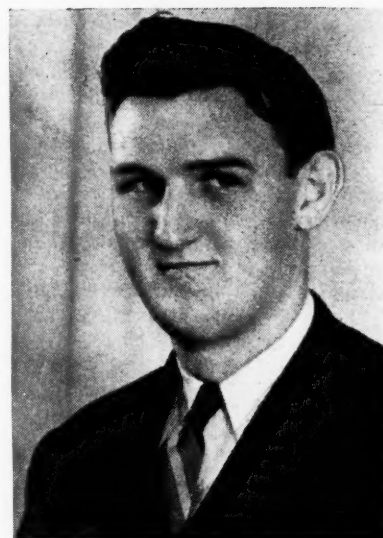
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Corporal Lumus Earl Walker

Miner's Son Victim of Attack At Pearl Harbor

Corporal Lumus Earl Walker, 20, son of Bob Walker, machine man at Zeigler No. 2 mine of the Beller & Zoller Coal & Mining Co., Zeigler, Ill., was killed in action during the Japanese attack on Pearl Harbor, Hawaii, Dec. 7. He was the first casualty to be reported by the rank and file of the U.M.W., according to the *United Mine Workers Journal*. Young Walker enlisted in the Air Corps on Dec. 3, 1940, and arrived in Hawaii Feb. 6, 1941. He was at Hickam field during the assault which cost him his life. A graduate of the Zeigler Community High School, he attended the Southern Illinois Normal University at Carbondale for one year.

Lillybrook Buys Raleigh Mines

Pemberton Coal & Coke Co., which operated Affinity and Big Stick mines, in the Winding Gulf district, Raleigh County, West Virginia, has been sold to the Lillybrook Coal Co., which for some years has been producing large tonnages from the Lillybrook and Killarney mines, in the same locality. Main offices of the company are in Beckley. A. U. Tieche is president; E. S. Pugh, vice president in charge of operations, and J. W. Ailstock, general manager. The Pemberton company had as its president W. J. Richards.

Carr Co. to Open New Mine

The Carr Smokeless Coal Co., Asco, W. Va., has been chartered with authority to open a new mine at Day Camp Branch, between Premier and Roderfield. Incorporators of the company are R. E. Brockman and J. K. Short, of Asco, and Sam Polon, of Welch. President Brockman announced that operation of the new mine would begin 30 days after the charter was issued, with 500 tons a day as the expected output. The company owns about 600 acres of land and has about 3,000 additional acres under lease. Coal will be mined from the Sewell seam.

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Pioneer Stripping Starts

A new stripping operation of the Pioneer Coal Co., 3 miles west of Sheffield, Ill., in the No. 6 seam, was opened on Jan. 2. Equipment includes a 5-W Monigham drag-line and a modern all-steel tippie with ORC wash box coal cleaner. Output, which now moves solely by truck, includes washed stoker, 1x3-in. nut and 3x7-in. lump. Rail connection will be built later.

To Mine Chatham County Coal

Carolina Coal Products, Inc., with offices in Southern Pines, N. C., expects to be mining Chatham County coal soon, with 60 men employed. The old mine, which is 13 miles from Pittsboro, is now being made ready for resumption of commercial operation. About 500 tons daily will be produced.

Coal-Mine Accident Fatality Rate Recedes Further

Accidents at coal mines of the United States caused the deaths of 76 bituminous and 11 anthracite miners in November last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

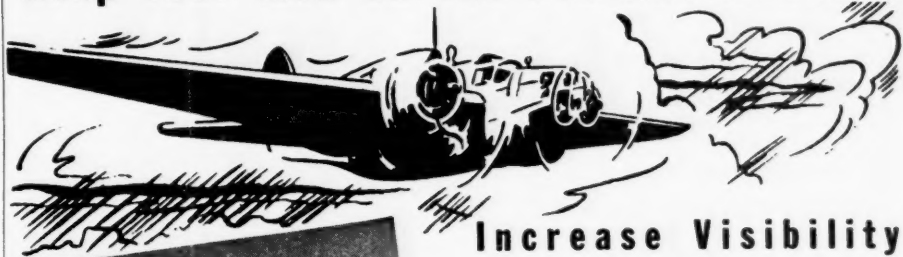
With a production of 42,865,000 net tons, the accident death rate among bituminous miners was 1.77 per million tons mined, compared with 2.58 in November, 1940.

The anthracite fatality rate from accidents in November last was 2.87, based on an output of 3,832,000 net tons, against 2.76 in the corresponding month of the preceding year.

For the two industries combined, the accident fatality rate in November last was 1.86, compared with 2.59 in the eleventh month of 1940.

Fatalities during November last, by causes

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UNITED STATES COAL-MINE FATALITIES IN NOVEMBER, 1941, BY CAUSES AND STATES

State	Falls of Roof	Falls of Face	Haulage	Underground			Elec- tricity	Ma- chinery	Other Causes	Shaft	Open- cut	Sur- face	Grand Total
				Gas or Dust	Explo- sions								
Alabama.....	2												2
Illinois.....	2	1	2				1		1	1			9
Indiana.....	1												1
Iowa.....	1												1
Kentucky.....	9		3				1				1	1	15
Montana.....	1												1
New Mexico.....		1											1
Ohio.....	4		2				1					1	8
Pennsylvania (bituminous).....	6							1					7
Tennessee.....	1		2										3
Virginia.....	2												2
West Virginia.....	13		8		3			1					25
Wyoming.....	1												1
Total bituminous.....	43	2	17		3		3	2	1	1	2	2	76
Pennsylvania (anthracite).....	4	1	1		1						2	2	11
Grand total.....	47	3	18		4		3	2	1	1	4	4	87

DEATHS AND FATALITY RATES AT UNITED STATES COAL MINES, BY CAUSES * January-November, 1940 and 1941

Cause	Bituminous				Anthracite				Total			
	Number Killed	1940	1941	Killed per Million Tons	Number Killed	1940	1941	Killed per Million Tons	Number Killed	1940	1941	Killed per Million Tons
Underground:												
Falls of roof and coal..	477	499	1,138	1.098	92	93	1,972	1.851	569	592	1,221	1.173
Haulage.....	176	168	.420	.370	36	24	.772	.478	212	192	.455	.381
Gas or dust explosions:												
Local.....	14	20	.033	.044	5	9	.107	.179	19	29	.041	.057
Major.....	267	58	.637	.128	6	14	.129	.279	267	58	.573	.115
Explosives.....	27	19	.064	.042	6	14	.129	.279	33	33	.071	.065
Electricity.....	29	35	.069	.077	7	4	.150	.079	36	39	.077	.077
Machinery.....	37	27	.088	.059	2	4	.043		39	27	.084	.053
Shaft.....	10	7	.024	.015	3	2	.064	.040	13	9	.028	.018
Miscellaneous.....	22	14	.053	.031	5	11	.107	.219	27	25	.058	.050
Stripping or open-cut.....	18	18	.043	.040	4	5	.085	.099	22	23	.047	.046
Surface.....	45	41	.108	.090	7	16	.150	.319	52	57	.112	.113
Grand total.....	1,122	906	2.677	1.994	167	178	3.579	3.543	1,289	1,084	2.767	2.148

*All figures subject to revision.

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Drop forged for strength, Superior Swivel and Single Link Couplings are built to stand the gaff. No welds to let go with resulting wrecks. Superior Couplings on your mine cars will prevent accidents and reduce haulage costs. Order Superior Couplings for your replacements and specify them on new equipment.

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Osmose-treated ties cut replacement costs and help prevent accidents

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*Name on request.

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FIRST—Better Ventilation.

SECOND—Greater GAUZE AREA, for increased sensitivity.

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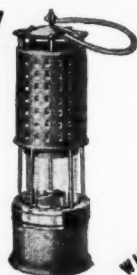


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For
Better
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BETTER LIGHT - LESS WEIGHT
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Big Sandy Canalization

A second survey of the possibilities of navigation and flood control, including canalization, of the Big Sandy River and its tributaries has been ordered by the Rivers and Harbors Board, according to press advices. The War Department accordingly has instructed Army engineers to proceed with such a survey, it is reported. The Big Sandy divides Kentucky and West Virginia, and advocates of the improvement look to a major coal and lumber movement, in addition to other shipping.

Blueprint Reading Explained

A second edition of "Simple Blue Print Reading With Special Reference to Welding" has been published by the Lincoln Electric Co., Cleveland, Ohio. Containing 146 pages, 5½x8½ in., the book is concisely written in simple, practical language for easy understanding. More than 50 drawings have been revised in the new edition, which is designed to aid and instruct anyone who must read blueprints, although the book has been especially published for those in the welding field. Eight new pages of drawings have been added to those previously used.

Trade Literature

ARC WELDING—Lincoln Electric Co., Cleveland, Ohio. Bulletin 412 describes the Lincoln "Shield-Arc," with self-indicating dual continuous control, said to provide the right type and size of arc for every job.

ELECTRIC HEATING UNITS AND CONTROLS—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Electric units and controls for industrial application involving the heating of liquids, solids or air are covered in Catalog 28-000. Specifications, descriptions, ratings and prices are given.

FLASHLIGHT BATTERY—Ideal Commutator Dresser Co., Sycamore, Ill. Bulletin cites highlights and specifications of the Ideal battery, stressing that it can be recharged again and again and requires little care except the occasional addition of distilled water.

INDICATING INSTRUMENTS—Meriam Co., Cleveland, Ohio. Condensed Catalog C-10 describes in compact form the company's line of U-type and well-type manometers, draft gages, flow meters, mercury pressure gages, tank gages and all accessories for accurately measuring pressures, vacuums and flows of liquids and gases.

INTEGRAL FURNACE BOILERS—Babcock & Wilcox Co., New York City. Bulletin G-34-A describes classes 9, 12 and 15 integral-furnace boilers for lower capacities (as low as 135 hp. or 9,000 lb. of steam per hour) and for stoker or oil firing. Illustrations define details of operation and construction features and indicate principal dimensions for various standard sizes.

MOTORS—Wagner Electric Corporation, St. Louis, Mo. Bulletin MU-183 contains detailed descriptions of the construction of repulsion-start-induction motors, repulsion-

induction motors, capacitor-start motors, split-phase motors, direct-current motors, small polyphase motors, fan motors and explosion-proof motors.

PORTABLE ELECTRIC TOOLS—Independent Pneumatic Tool Co., Chicago. Catalog 37 covers the complete 1942 line of Thor portable electric tools. Containing four major sections, the book gives descriptions, specifications and prices on the entire Thor line of universal type electric drills, drill stands, screw drivers, nut setters, tappers, saws, hammers, nibblers, grinders, sanders, polishers and electric tool accessories.

PRECISION INSTRUMENTS—Cambridge Instrument Co., Inc., New York City. List CEC describes industrial models of analyzers, indicators and recorders that are said to measure with laboratory accuracy. Recording gas analyzers, together with pH and other equipment for making precise measurements that effect savings of time, material and labor in production, are featured.

RAIL BONDS—Mosebach Electric & Supply Co., Pittsburgh, Pa. Bulletin 142 tells the advantages of flashwelded rail bonds, showing styles "for every bonding requirement."

RECORDING EQUIPMENT—Leeds & Northrup Co., Philadelphia, Pa. Catalog N-91-163 recounts recent improvements in Micromax CO₂ recording equipment, with full-size reproductions of round and strip-chart records and illustrations of installations.

RECTIFIERS—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Bulletin B-3024, on Ignitron rectifiers in 250- to 900-volt

ratings for use in electro-chemical, mining, transportation, and steel mills, gives a complete technical discussion of design, construction and operation, covering the principles involved, rectifier circuits, and a description of the physical parts. Included in the construction details are vacuum-tight welded steel Ignitron tanks, anode and cathode assemblies, Ignitor, and cooling system.

SAFETY EQUIPMENT—Kimball Safety Products Co., Cleveland, Ohio. Bulletins describe items for body protection, eye protection, hand protection, and protection for welders.

STEEL TUBING—Babcock & Wilcox Tube Co., Beaver Falls, Pa. Technical Bulletin 6-D, "Properties of Carbon and Alloy Steel Tubing for High Temperature-High Pressure Service," includes new data on physical properties and behavior in service of B. & W. Croloys and other materials, has new sections on the seamless-tube manufacturing process, rupture testing, maximum allowable working stresses, steel for sub-zero application, effect of hydrogen, and air-handling properties; and has a section on common causes of tube failure.

TRUCK TIRES—B. F. Goodrich Co., Akron, Ohio. Operator's Handbook provides data on obtaining maximum service from truck tires. A main feature is a 15-page section dealing with "Factors Governing Truck Tire Service," including charts and tables portraying the value of proper inflation and loads, the dangers in over- and under-inflation, mismatching of dual tires, causes of uneven tread wear, and the effect of overloads and excessive speeds in generating heat.

WISE-PRESS—Studebaker Machine Co., Chicago. Folder depicts in word and picture salient features, characteristics and advantages of the Studebaker hydraulic vise-press.

WATER TREATMENT—Water Treatment Co. of America, Pittsburgh, Pa. Booklet explains in full the treatment of boiler feed waters in "nature's own way" with "Baerite" organic formulas. Written in semi-technical style, it explains the functions of these formulas in balancing waters which cause rust, scale, corrosion, foaming priming and other boiler troubles.

WELDING TRAINING—International Acetylene Association, New York City. Prepared primarily to assist instructors in planning courses, "Training Oxyacetylene Welding and Cutting Operators—Instructors' Outlines" is divided into chapters outlining essential information that should be presented in courses for the training of various types of welding operators. The material has been divided into self-contained units, each including the four essential parts of any particular lesson, namely: an outline for a classroom lecture, suggestions for study assignments, recommendations for the material that should be demonstrated and discussed, and a description of the practice exercises the student should do in the shop. Paper-bound copies are 25c. each; deluxe edition, cloth-bound, sells for 75c.

WRENCHES—Blackhawk Mfg. Co., Milwaukee, Wis. Handy guide describes socket, box-type, specialty and torque indicating wrenches, their uses and new features.

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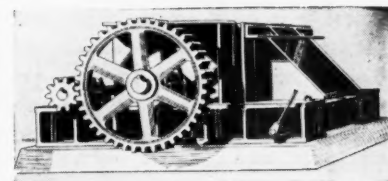


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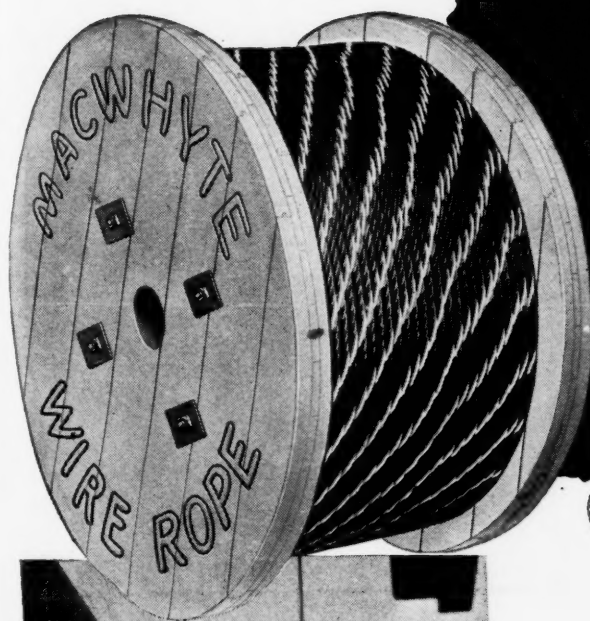
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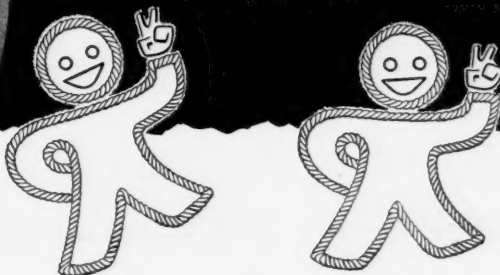
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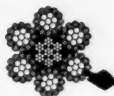
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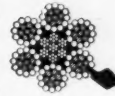
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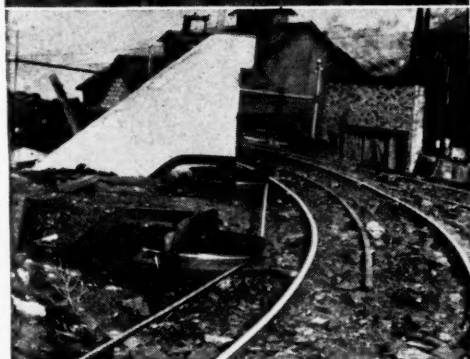
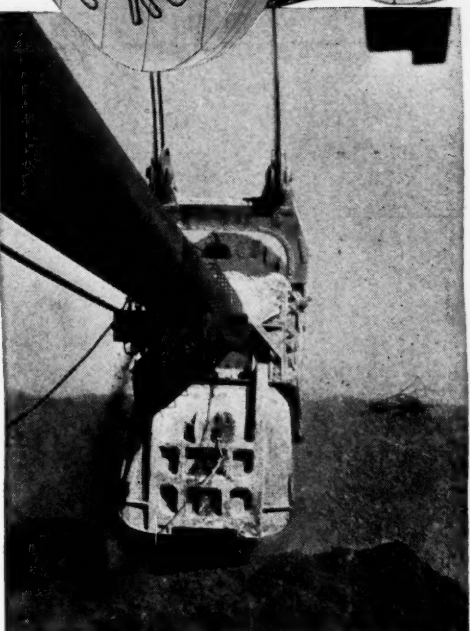
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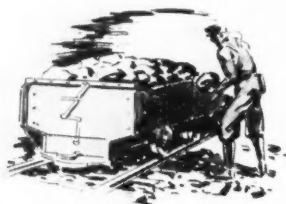




Pete tells why coal mining is better

"LOOKS like the country'll be needing all the coal we can get out for quite a spell. Kinda like old times. But we're sure getting it out in better shape than we used to. These new permissibles give us better lump.

"In the old days we shot a lot of fines. But Hercules service men soon showed us that permissibles could



shoot lump—or any size—if you get the right explosives for the job, and shoot 'em right.

"The Hercules people were the first to make permissibles with a lot more sticks in a box. Then they kept improving them. Seems like that high-count business gave Hercules the idea for working out

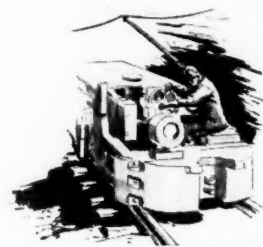
powders, and ways of shooting, that will lay down the coal in any mine just the way you want it whether it's for machine or hand loading.



"And Hercules hasn't got so many permissibles that you can't keep track of 'em either. With Red H*, Hercoal*, and Hercogel*, you can shoot most coal to suit anyone. But if you run into something that's extra special difficult, why Hercules has a powder to take care of that, too.

"I saw it figured out where these new powders that Hercules made first are saving the coal mines a million dollars a year on the cost of permissibles. And I wouldn't wonder a bit if that's right. They're improving their powders all the time, and

the Hercules service men are always finding better ways to shoot the coal. No wonder the boss sticks to Hercules permissibles."

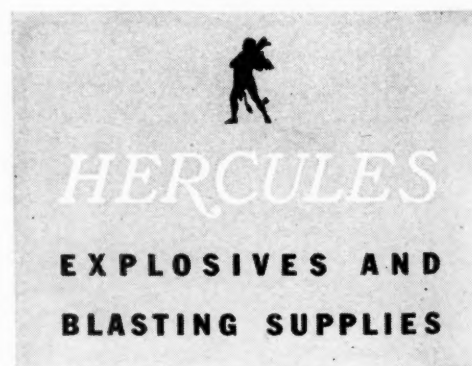


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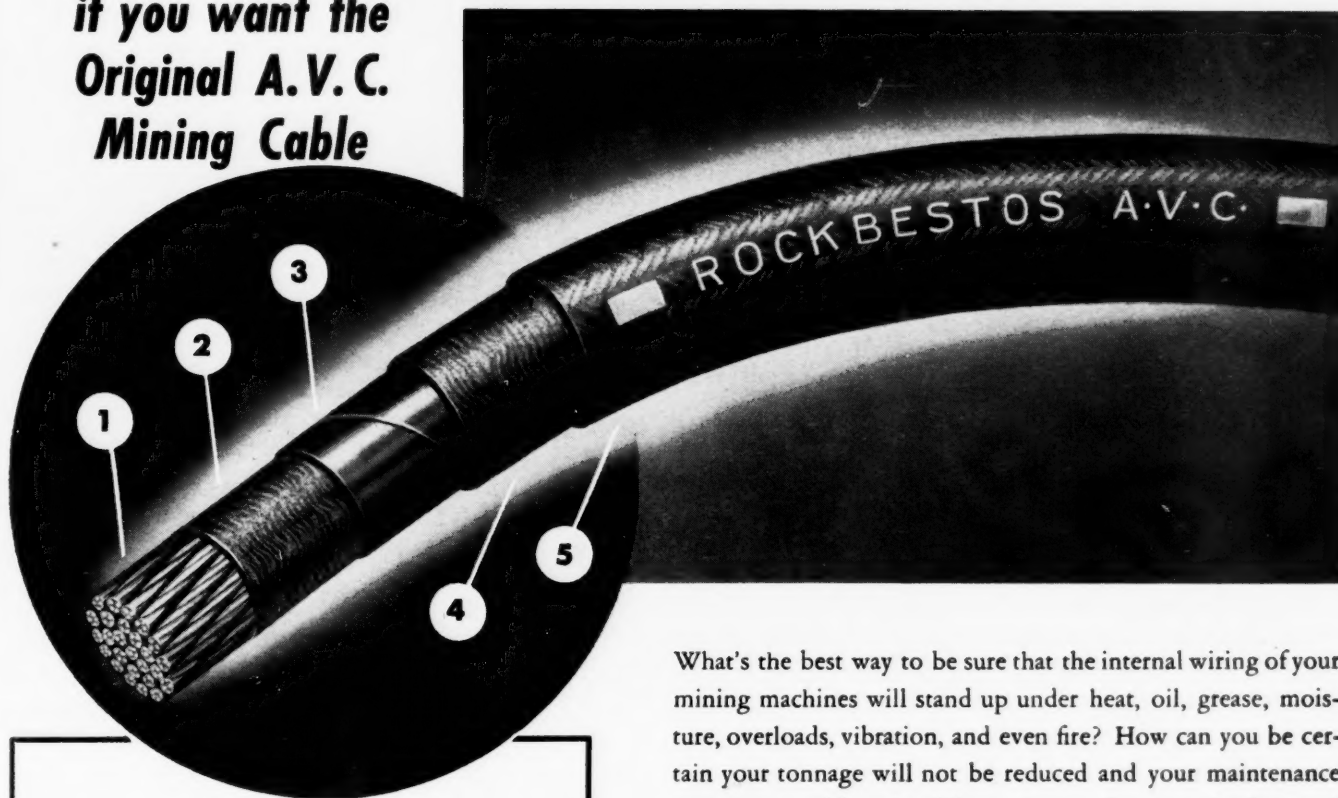
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B-36



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- 1** The flexible tinned copper conductor is perfectly centered and remains so for the life of the cable.
- 2** Heatproof felted asbestos protects against conductor-heating overloads and copper-melting arcs.
- 3** Asbestos-sealed varnished cambric provides high dielectric strength and moisture resistance.
- 4** Another felted asbestos wall serves as a heat-barrier against high ambient temperatures.
- 5** The tough impregnated asbestos braid is resistant to heat, flame, moisture, oil, grease and alkalis.



What's the best way to be sure that the internal wiring of your mining machines will stand up under heat, oil, grease, moisture, overloads, vibration, and even fire? How can you be certain your tonnage will not be reduced and your maintenance costs increased by wire failures that send cutters, loaders, and locomotives to the repair shops?

The answer is easy. Insist, *every time*—on the mining cable that bears the name—ROCKBESTOS A. V. C.—lettered in white on the braid. Only the original Rockbestos A. V. C. Mining Cable carries the name. It's put there for your protection—and it's your guarantee of better service and less equipment outage.

Ask any of the jobbers listed below for the genuine Rockbestos A. V. C. Mining Cable. They have it in stock. Be sure to look for the name on the cable.

For sizes, diameters and weights refer to the McGraw-Hill Coal Mining Catalogs or write to Rockbestos Products Corporation, P. O. Drawer 1102, New Haven, Conn., for Bulletin No. 30-C and a sample.

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The Wire with Permanent Insulation

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↑ A REAL ONE-MAN DRILL, CP No. 32 Sinker weighs only forty-seven pounds. Properly balanced, easy to handle, the 32 Sinker is the perfect drill for flat or upward drilling, taking up bottoms or general utility drilling requiring a hand-held tool.

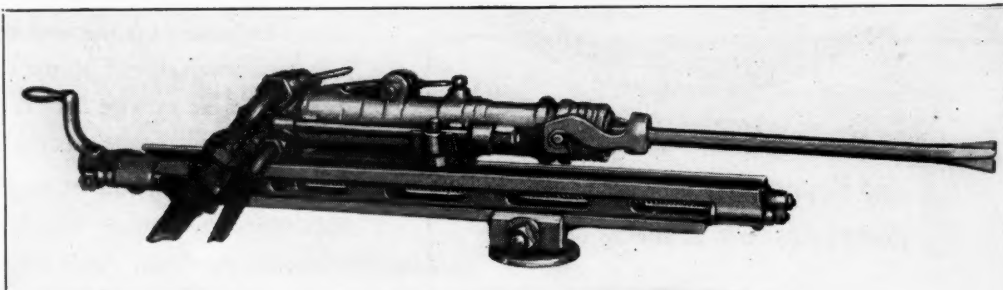
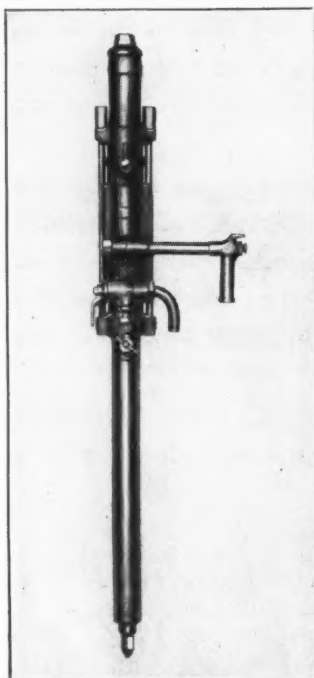
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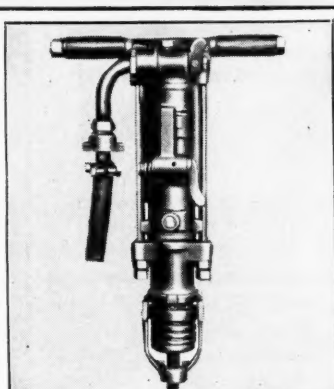
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General Offices: 6 E. 44th St., New York, N. Y.




↑ **SYMMETRICAL IN DESIGN** and well balanced. With the CP cradle and shell mounting, CP No. 32 Sinker Drill can be used for drifting through rock under coal beds. CP 32 Sinker has a flat back to facilitate horizontal drilling from a board.

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← **FULLY CUSHIONED PISTON**, bushings at points of wear, and an automatic lubrication system which distributes oil to all working parts, insure long life and low maintenance costs. Its unusually low air consumption makes the CP No. 32 Sinker Drill ideal for operation with portable air compressors.



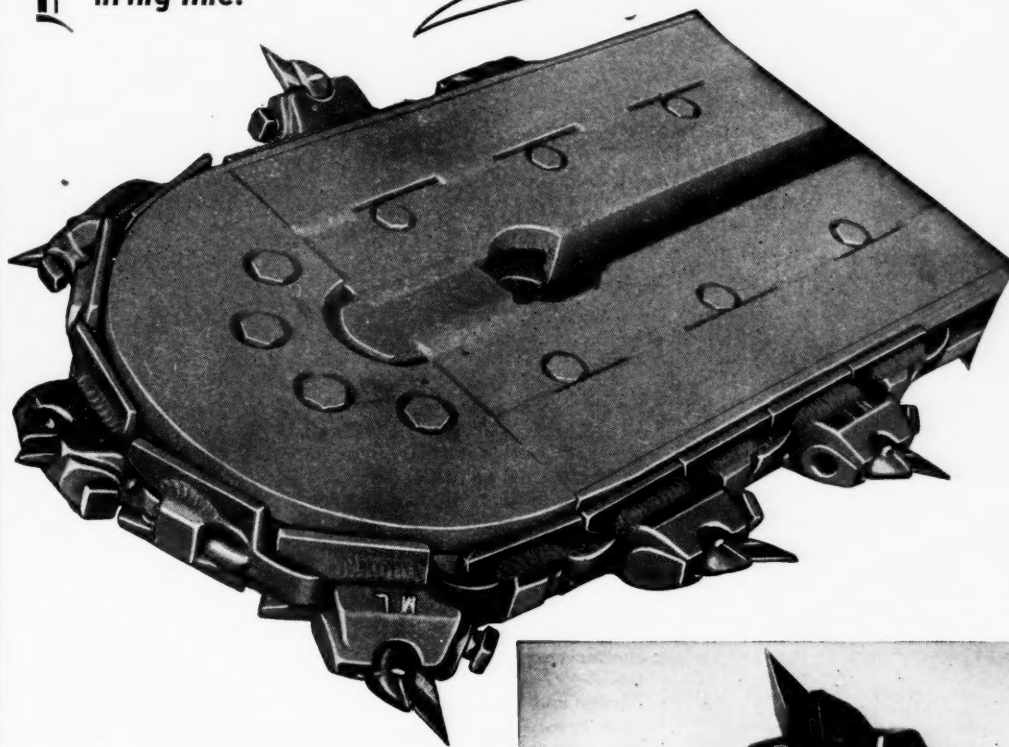
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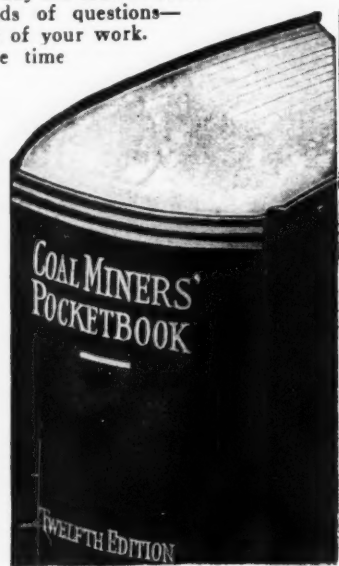
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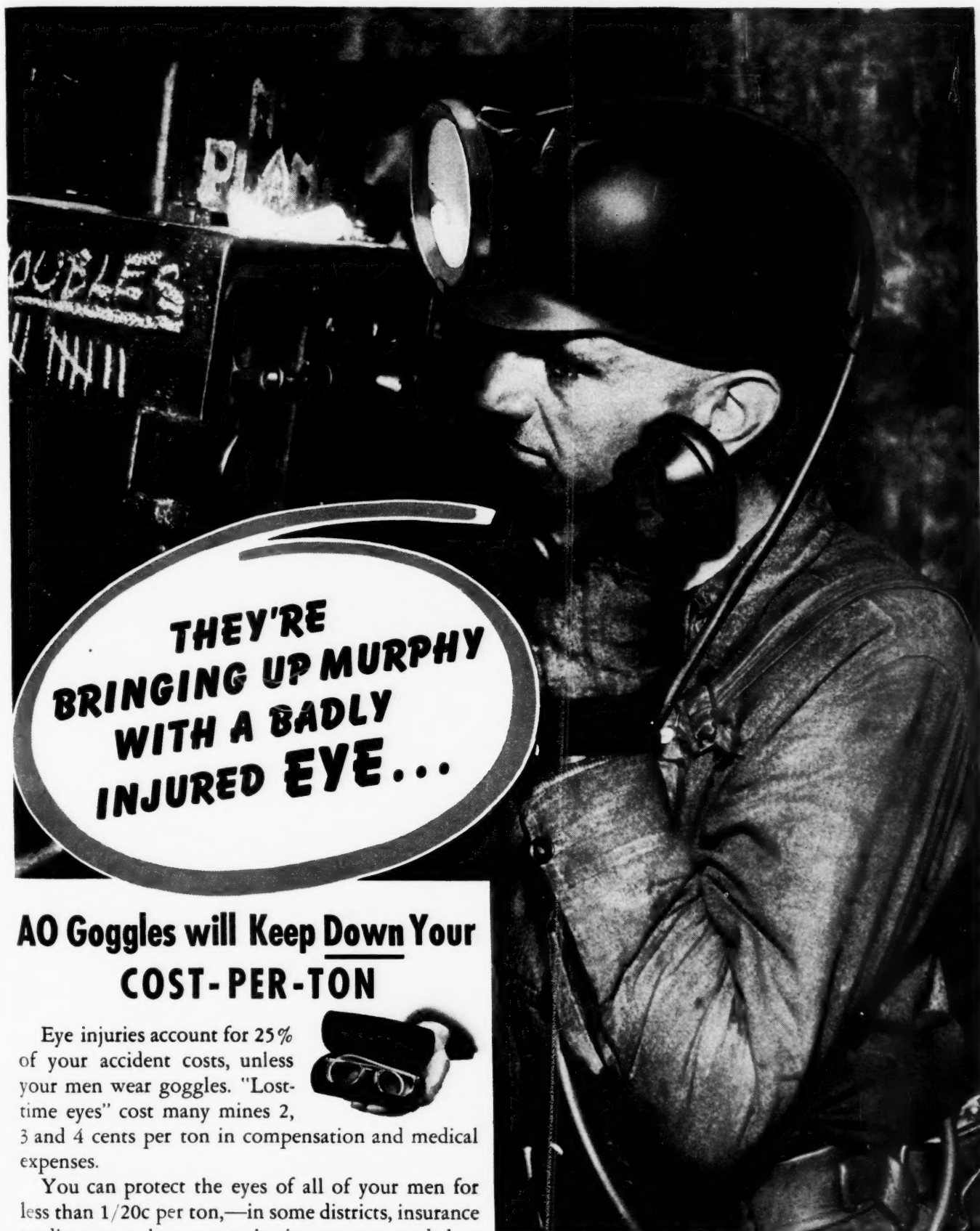
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THE AMERICAN RED CROSS \$50,000,000 WAR FUND

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AO Goggles will Keep Down Your COST-PER-TON

Eye injuries account for 25% of your accident costs, unless your men wear goggles. "Lost-time eyes" cost many mines 2, 3 and 4 cents per ton in compensation and medical expenses.



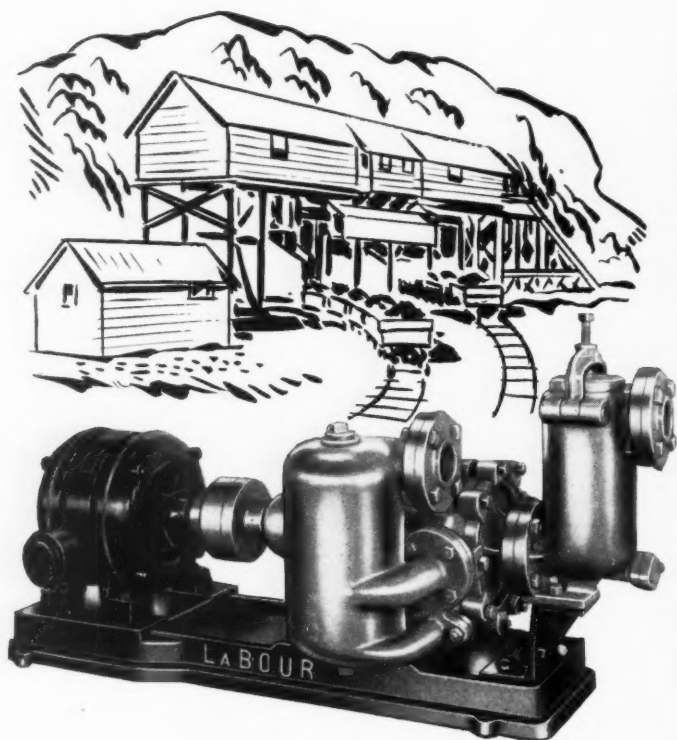
You can protect the eyes of all of your men for less than 1/20c per ton,—in some districts, insurance credits more than cover the investment needed to buy the equipment.

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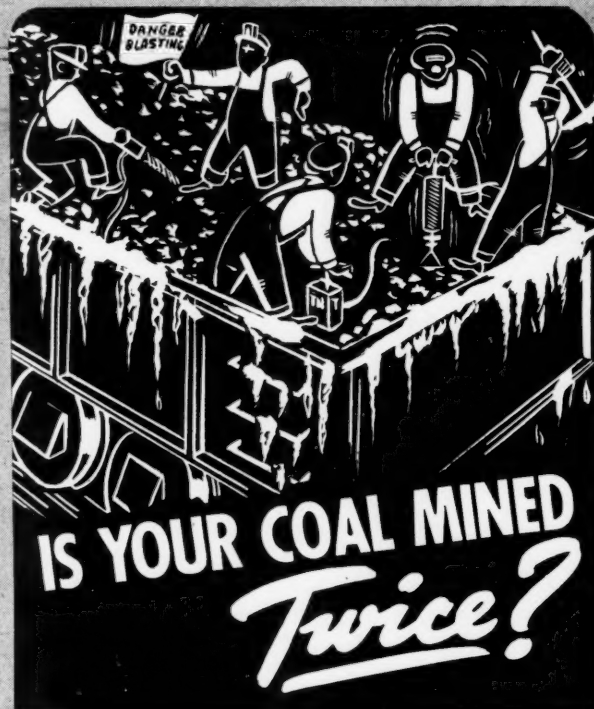
If you are looking for lower dewatering costs, consult LaBour.

LABOUR



PUMPS

THE LABOUR COMPANY, Inc., Elkhart, Ind., U. S. A.



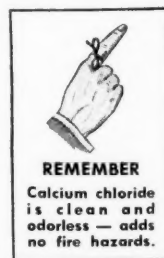
If every dealer charged back to the mine his extra costs of unloading frozen coal you can bet he would get freezeproofed coal thereafter.

And when the dealer has to mine the coal all over again to get it out of the car it isn't the same grade of coal at all. Disintegration from freezing and from this second mining are likely to turn high grade lump into low grade slack.

Don't ask the dealer to mine the coal all over again. Give him coal that stays unfrozen, unloads and reloads readily — is clean and odorless. Give him coal that is freezeproofed with calcium chloride. And, if he wants Dustless Coal, remember that when coal is dustproofed with clean, odorless calcium chloride, it is freezeproofed too — you give him two important services at one low cost.

WRITE FOR BOOKLET

Ask us for bulletin 37 — a study of coal treating experience. It will help you deliver the best coal for the money.



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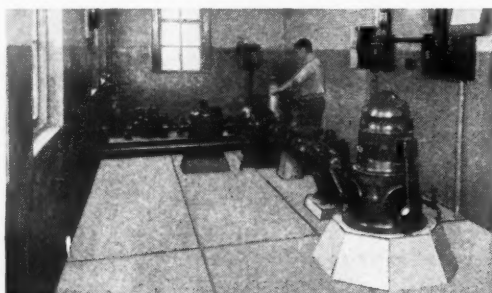
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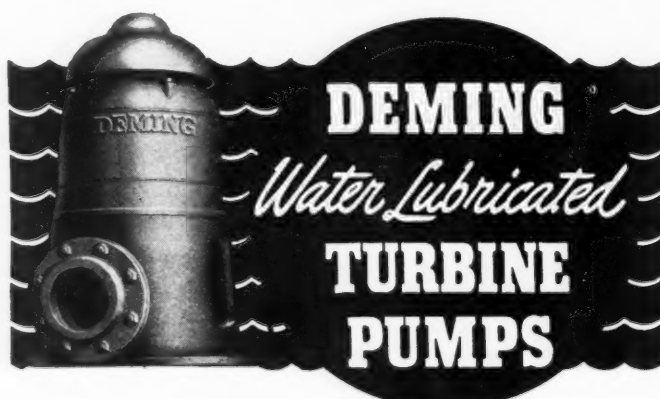
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Can you answer these questions—

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Can a miner live in air in which the oxygen content is reduced to 17 per cent?

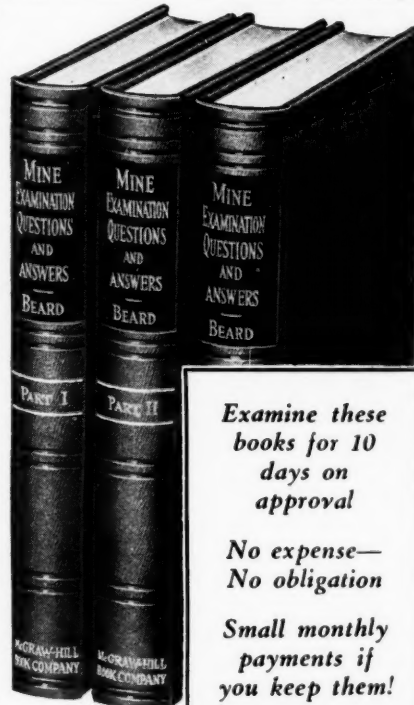
Name five duties imposed on mine foremen by law?

In what time can an engine of 40 effective hp. pump 4,000 cu. ft. of water from a shaft 360 feet deep?

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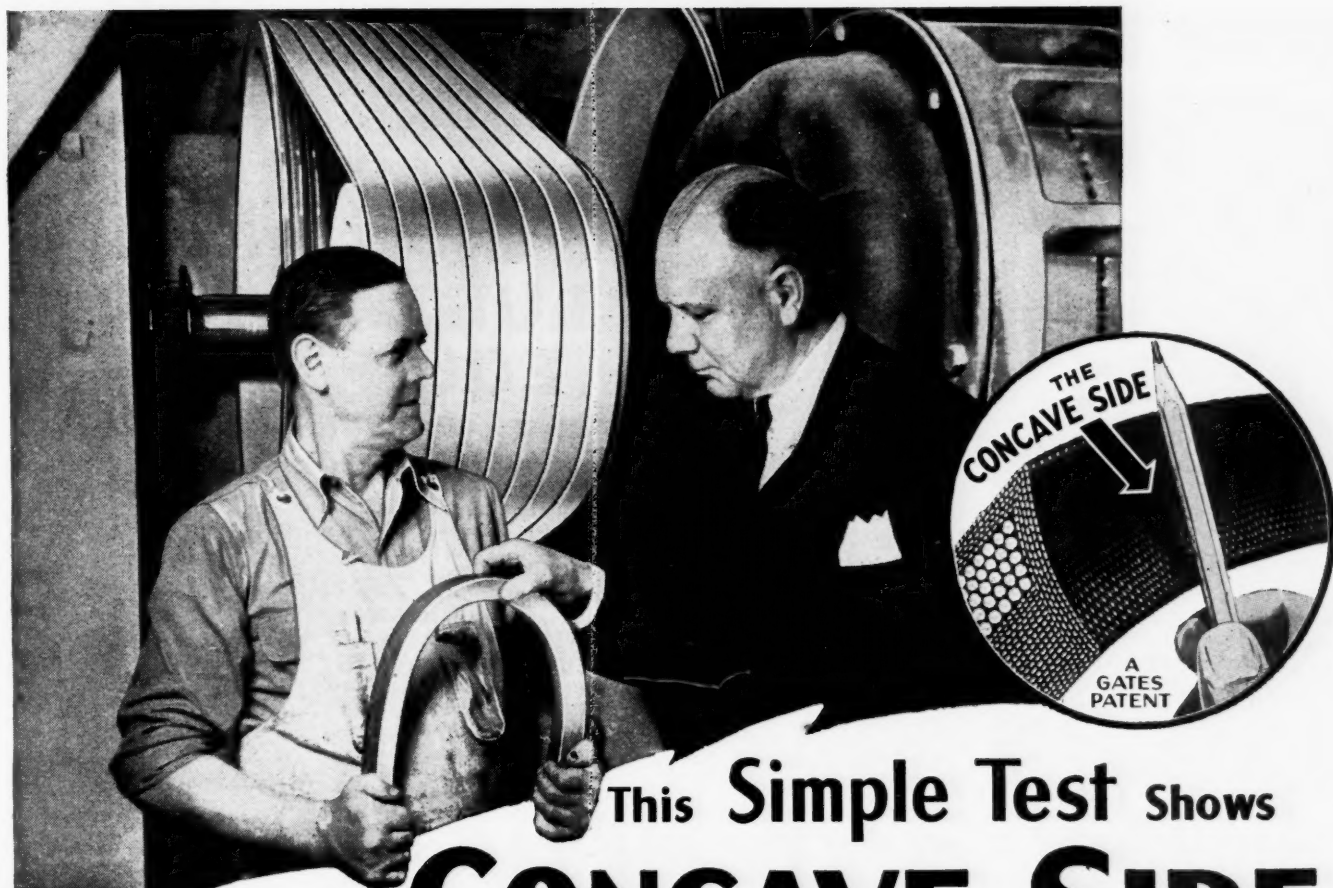
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Why the **This Simple Test Shows**
CONCAVE SIDE
Cuts Belt Costs!

**What Happens
When a
V-Belt Bends**



FIG. 1



FIG. 2

If you care about belt costs, pick up any V-belt you have handy and make this simple test:—

Bend the V-belt while you grip its sides and you will feel how the belt changes shape. The top, under tension, narrows. The bottom widens. The sides of the belt bulge out. Clearly, if its sides were straight to begin with, the bent belt is forced into a shape that does not fit the sheave groove—as shown in figure 1, on the left.

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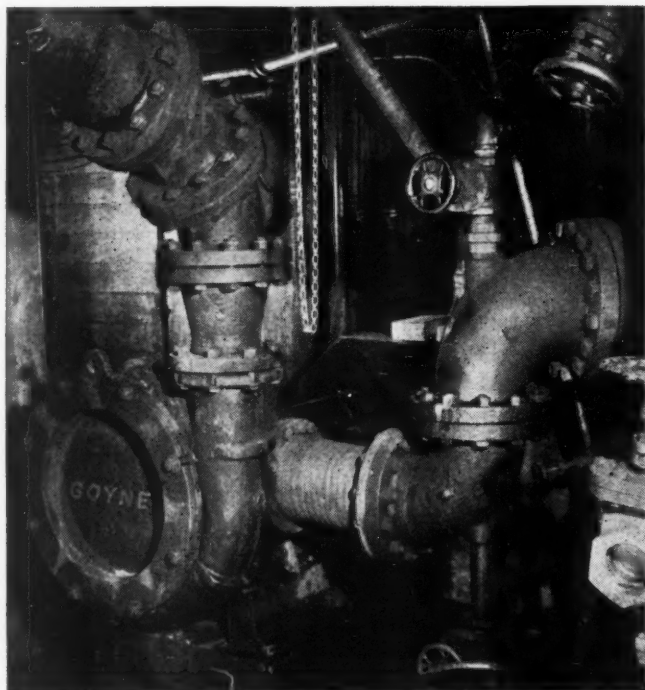
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2. The one packing box of the pump is subjected only to suction pressure and is readily kept clean by a low pressure clear water line. Long packing and shaft sleeve life is assured.
3. Impeller clearance is adjusted *while the pump is running*, insuring constant pump capacity so essential for uniform washing.
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All inquiries receive prompt and careful attention.

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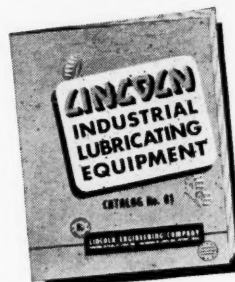
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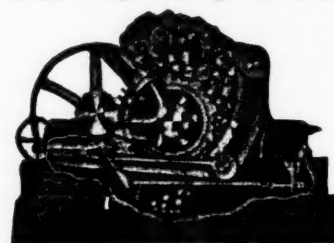


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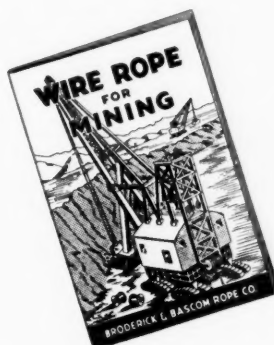
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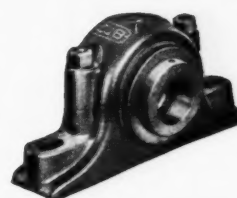
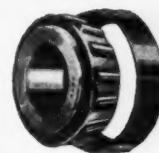
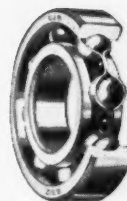
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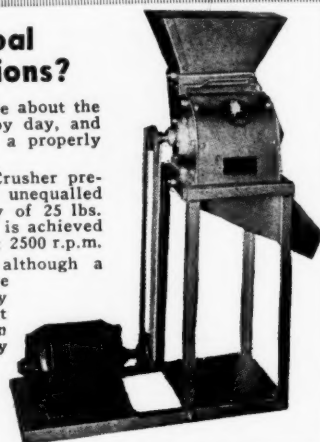
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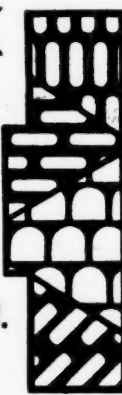
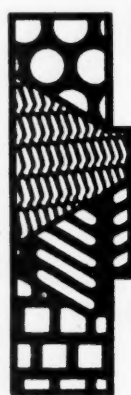
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For Lease: 2449 acres No. 5 seam in Warrick County, Indiana, 1223 acres of fee land. The New York Central Railway runs through 1001 acres and remainder of land is in trucking distance of the railroad, or will lease 100 acres, light overburden on railroad with 400 foot switch. In reply state name of operating company. Address J. R. Wasson, Boonville, Indiana.

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400 Acres owned and leased for sale. Coal similar to Miles Creek No. 2. Modern equipped mine. Accessible to trucks and rail. Ready market. Selling because ill health. For inspection or particulars write W. W. Bentley, Louisa, Ky.

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Four track electric tippie, screens, Loading Booms, Picking tables approx. 8000 ft. 42 in. gauge track. 50, 1-ton mine cars.

300 acres of unmined Baker town coal.

1200 acres of upper & lower Kataning.

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Plenty of mine timber can be equipped for mass production.

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Stripping Equipment

Capacity over million yards per month. For rent, sale or contract. Part or all.

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FOR SALE ONE CARDOX PLANT

In Good Condition
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Equipment Wanted—See page 152

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One Corner of Generator Room

Modern—Set up as operated—Excellent condition

BOILERS

3—1046 B.H.P. Wickes Cross Drum Water Tube Boilers, ASME, Mass. Standard, Boiler pressure 250#—good for 200% rating. Equipped with Combustion Eng. Co. slag screens, air cooled walls, Lopulco arches, coal feeders, fish tail burners; and 55 ton steel plate air jacketed and warmed bunkers with circulating fans. Equipped with Superheater Co. superheaters for 100° F.

Pulverized Coal Bin System for Wickes Boilers consisting of:

- 1—50 ton per hour Coal Crusher, M.D.
- 1—50 ton per hour elevating and scraper Conveyor, M.D.
- 1—Richardson automatic scales and magnetic separator.
- 1—350 ton coal Bin.

3—Sets, 5 tons per hour Raymond Roller Mill, Exhausters, Driers, Cyclone Collectors and Screw Conveyors, all motor driven.

1—Cochrane 360,000# per hour Deaerating Heater and Vent Condenser.

Boiler House Equipment consisting of:

Ash handling and Conveying equipment, Testing tanks, Weighers, Soot blowers. Complete metering equipment, Recorders, Gauges, Regulators, boiler feed Pumps, etc.

TURBO GENERATORS

1—3500 K.W. General Electric Co. Bleeder Type, Turbo Generator, 3 phase, 60 cycles, 6600 Volts, 3600 R.P.M., 4—stage, 0#—15# ga. extraction type, 225#, 100° F. superheat, 28" maximum vacuum, 128,000# per hour extraction maximum at full load. Can be operated either condensing or non-condensing.

1—1600 K.W. General Electric Co. Turbo Generator, 3 phase, 60 cycles, 6600 volts, 3600 R.P.M., Form E, Curtis Condensing turbine, 230#. Can be operated either condensing or non-condensing.

Power House Equipment consisting of:

- 1—20-panel Switchboard.
- 1—50 KW Turbine driven Exciter
- 1—100 KW G.E. Motor driven Exciter.
- Miscellaneous—Overhead Crane, Electric yard Crane, Steam yard Crane, Gas Tractor.

1—Condensing Equipment for 3500 KW Turbo Generator consisting of—1 Allberger Spiroflow Surface Condenser, condensate pumps, circulating pump, 2 Allberger Occluders and 2-stage After Condenser.

1—Condensing Equipment for 1600 KW Turbo Generator consisting of 3 pass Allberger Surface Condenser, condensate pump, turbine and motor driven circulating pumps, steam driven Knowles air pump.

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200-B Bucyrus 6 years old. 75 ft. Boom, 60 ft. Dipper stick, 6 yd. Dipper Steam Shovel.

SHOVEL & DRAGLINE:
4 yd. 120 B Bucyrus Electric Shovel & 100 ft. boom Dragline

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3W 4W & 5W Monighan Walkers, 90 to 110 ft. booms.
3 Yd. P&H. 900, 97' boom.
2½ Yd. 48B Bucyrus 80' boom.
2 Yd. 750 Lima, 60' boom.

AIR COMPRESSORS:
(7) Steam 60 ft., 300 ft., 600, 1000 & 1940 ft.
(12) Belted, 360, 676, 870, 1000, 1390 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2600, 5000 ft.
(14) Gasoline, 110, 160, 220, 310 & 370 ft.

COAL CRUSHERS:
Jeffrey Single Roll 18x18, 24x24 & 30x30
Link Belt 26x24 Double Roll Crusher

HYDRAULIC CARWHEEL PRESSES:
100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Caldwell - Niles - Wood - Watson Stillman

RUBBER CONVEYOR BELTS:
1000' 60", 800' 30", 500' 20", 1600' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14".

CONVEYOR PARTS:
Idlers, Head & Tail Pulleys, Steel Frames, Tripper, etc., 14 in., 60 in. Large Stock here.

SYNG. MOTOR GENERATORS & ROTARYS:
100 KW Ridgway 1200 RPM 3/60/2300/250-275
150 KW G.E. 1200 RPM 3/60/2200-250-275
200 KW Ridgway 900 RPM 3/60/2200-250-275
3-100 KW G.E. 275 v. 1200 RPM Rotarys

STORAGE BATTERY LOCOMOTIVES:
2½ ton Whitcomb 24 ga. New Batteries
2-4 ton G.E. 30 in. ga.
3-5 ton Mancha 30 in. ga.
4-5 ton G.E. 36 in. ga.
3-7 ton Goodman 36 ga. Battery & Trolley
8-6 ton Baldwin Westgh. 42 ga. & 36 ga.

TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4-6 ton & 3-5 ton Goodman 36 ga.
3-6 ton Goodman 30 ga.
4-6 ton Goodman 42 ga.
5-6 ton Westinghouse 42 ga.
2-8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex

CARS:
120-4 ton 42 ga. S.D. Mine Cars
60-Western 16-20-30 yd. Side Dump

SHOVELS, CRANES & DRAGLINES:
3 W 90' Boom, 6 W 160' Boom, Model 6150, 175' Boom, Diesel, Monighan Walkers
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1½ yd. Marion 450 Elec. Shovel
1½ yd. Lima Diesel Shovel & Dragline
2 yd. Link Belt Elec. Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

MINE LOADERS:
Junior Joy 36 ga. Low Pan
Conway 20 Mucker
3-5 BU & 7 BU 36 or 42 ga. Joy
9-Goodman 260 & Jeffrey 44L

MISCELLANEOUS:
5x160' Traylor Rotary Dryer
100 HP G.E. 3/60/440 v. 900 RPM Elec. Motor
6 Goodman 12CA & 12DA 6 ft. Cutters
9x8 Sullivan Mine Compressor
Clamshell Buckets ¾, 1, 1½ & 2 yd. Cap.
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WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers & Rotary Converters. Also Rails, Screens, Pumps, Cars, Mine Loaders & Mining Machines.

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1—500 KW General Electric Rotary Converter, form P, pedestal type, 250/275 volt DC, switchboards and switchgear, including transformer for 2300 volt.

1—200 KW General Electric Rotary Converter, same characteristics as above set.

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Available for immediate shipment—several 6, 8, 10, 13 and 15-ton rebuilt locomotives.

We Specialize in Buying Complete Mines That are Going Out of Business or from Receivers in Bankruptcy, Administrators of Estates, etc.

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★ WE BUY & SELL USED & REBUILT EQUIPMENT FOR MINES

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**MINE EQUIPMENT
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530 sets WHEELS & AXLES.

3" Axles with 18" Timken Roller Bearing Wheels 42" gauge—Will sell wheels or axles separately.

7—Westinghouse & G. E. Mine Locomotives—5 to 18 Ton—500 Volts—42" Gauge.

2—Battery Locomotives—5 ton—Ironton Engine Co. — with charging set.

500 KW G. E. Motor Generator Set 550 Volt—Complete.

Thomas Single Drum Hoist with 50 HP DC Motor. 250 volt.

Also tonnage of Drawbars, side irons and Hitchings.

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Rotary Converter Equipment
100 KW—250 or 275 volts d-c.
200 KW—600 volts d-c.

Air Compressor
7x7" Ingersoll-Rand, portable

Steel Structure (20 ft. high) for mounting outdoor switches, etc.

Outdoor Switches (3-pole, group oper.) TA-2, 400 ampere, 37000 volt, G.E. disconnecting switch
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6 ton Milwaukee—Gasoline
36" Gauge

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STEEL TIPPLE

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4—1000 KW FREQUENCY CHANGERS:
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CE-7 Sullivan Shortwall 250 v. 6' bar
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MINE LOCOMOTIVES

4½ ton West. 250 v. 36/42" ga.
6 ton Atlas 220 v. 3 ph. 60 cy.
10 ton Milwaukee GASOLINE

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1—100 kw. West. 250 v. 2200/3/60
900 rpm. Syn.
100 kw. G.E. Rotary Synchronous 275
v. 1200 rpm. 2300/4000 transform-
ers.
1—150 kw. Crocker Wheeler 250 V.D.
C. 220/440/3/60 induction MG set.
2—150 kw. West. 250 v. 1200 rpm.,
2300/4000 V.A.C.—Exact duplicate
Rotary Converters can be operated
in parallel for 300 kw.

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3—10 kva. Pgh. 2200-220/110/1/60
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Thomas. 3 HP ratio 100:1
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22"x10' Putnam Lathe

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La Del Shaker Screen 62¼" wide, 8'
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1—12 B.U. 250 v. 42" ga.

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25 HP. Thomas 18" face 20" dia.
100 H.P. Lidgerwood 2 drum AC or
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1—Goodman Duck Bill.

SLIP RING MOTORS

3 ph. 60 cy.

HP.	Make	Speed	Type
700	G.E.	393	MT-432
400	West.	1170	CW
280	Burke	800	EM-65
200	West.	690	CW-956A
100	West.	1750	

230 V. D.C. MOTORS

HP.	Make	Speed
125	G.E.	1750 rpm
100	West.	250
85	G.E.	530
75	West.	1700 rpm.
75	West.	475
75	Reliance	1750
50	West.	975 rpm.
50	West.	1700 rpm.

A.C. GENERATORS—3 ph. 60 cy.

75 kw. G.E. 220 v. 900 rpm.
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100 kw. G.E. 550 rpm.
150 kw. Crock. Wh. 550 rpm.

A. C. Motors—3 ph. 60 cy.

HP	Volts	Make	Type	Speed
150	220/440	West.	CS	1800
150	2300	West.	Syn.	900
200	2200/440/220	West.	CS	250
200	2200	G.E.	IK-15	1200
250	220/440	West.	CS	1200
200	220/440	West.	CS	720
200	220/440	West.	CS	600
225	2200	West.	CS	900
250	220/440	West.	CS	900
250	2200	West.	CS	1200
275	2200	West.	CS	1800
300	220/440	West.	CS	1150
300	2300	West.	CS	1200
300	2200/440/220	West.	CS	450
350	2200/440/220	West.	CS	450
400	2200/440/220	West.	CS	500
450	2200/440/220	West.	CS	600
500	2200/440/220	West.	CS	720
600	2200/440/220	West.	CS	900

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4x3 Harris. 320 rpm.
4x4 Weinman. 500 gpm.
6x6 Gould. bronze. 1300 gpm.
8x8 Weinman. bronze.
5x6 Hayton. 750 gpm.
6x6 Manistee. 750 gpm.
6x6 American. 1000 gpm., bronze.
6x6 Weinman. 1000 gpm.

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50 kw. West. 220/3/60 Ames STEAM.
75 kw. G. E. 250 V. D.C. Skinner
STEAM.
75 kw. G.E. 220/3/60 Bessemer GAS.
80 kw. West. 250 V. Belted 110 Bes-
semer GAS.
100 kw. Fair Morse 2400/3/60 belted
DIESEL.
175 kw. G.E. 2200/3/60 Ridgway
STEAM.
175 kw. West. 2200/3/60 Skinner
STEAM.
200 kva. Fair Morse 2400/3/60 4 cyl
DIESEL.
225 kw. Elec. Machy 2300/3/60 I-leal
STEAM.
300 kw. West. 250 V. D.C. Skinner
STEAM.

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1—Kerr Steam Turbine 450 BHP 3800
rpm., 5" intake 12" exhaust with
Kerr Reduction Unit 3800 to 720
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Jeffrey type 43 A. 250 V.D.C. Short-
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6' undercut. 36" ga. Flameproof
motor.

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With weigh pan & scale.

PUMPS and FANS

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2—400 H.P. Heine Cross drum water tube
boilers, 3½"x16" tubes, delivering satu-
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1—Steel Stack 66" in diameter, 150' high.

Also incidental power plant items, miscel-
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The above items displaced on June 15, 1941,
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1—Diamond 14" Friction Drum with
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50 H.P. electrical equipment.

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drum 6000 ft. 1½" rope, 300 H.P.
electrical equipment.

1—Diamond Haulage Hoist 60"
drum 5000 ft. 1" rope and 200
H.P. motor and control.

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drum 8000 ft. 1½" rope with 300
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Shaft Hoist, 350 ft. 1½" rope
with 400 H.P. motor and control.

1—Nordberg Cylindro-conical Shaft
Hoist, 400 ft. 1½" rope with 600
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And other hoists to suit all
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Several machines can be delivered each
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300 KW G.E. SYN. 275 V. HCC. 6 Ph. 60 Cy.
1200 RPM. form P. 2300/4000 V. Transformers.
300 KW G.E. SYN. 275 V. HCC. 6 Ph., 60 Cy.,
1200 RPM. form P. 2300/4000 V. Transformers.
300 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200
RPM. Pedestal type, 2300/4000 V. Transformers.
200 KW WEST. SYN. 275 V., 6 Ph., 60 Cy., 1200
RPM. Bracket type, 2300/4000 V. Transformers.
200 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1200
RPM. Pedestal type, 2300/4000 V. Transformers.
150 KW R.W. SYN. 275 V., 6 Ph., 60 Cy., 1200
RPM. Pedestal type, 2300/4000 V. Transformers.

MOTOR GENERATORS

215 KW AL-CH SYN. 275 V., 2300/4000 V., 3 Ph.,
60 Cy., 100% P.F., 1200 RPM. Man. Switchg'r.
200 KW G.E. SYN. 275 V. 2300/4000 V., 3 ph. 60
Cy. 80% P.F. 1200 RPM. Man. Switchgear.
150 KW R.W. SYN. 275 V., 2200 V., 3 Ph., 60
Cy., 100% P.F., 900 RPM. Manual Switchgear.
100 KW WEST. SYN. 275 V., 2300 V., 3 Ph., 60
Cy., 100% P.F., 900 RPM. Manual Switchgear.

LOCOMOTIVES

13-Ton WESTGHE, 250 V., 908-C mts., 36" Ga.
10-Ton GOODMAN, 250 V., 29-A Mts., 36" Ga.
8-Ton WESTGHE, 250 V., 906 Mts., 48"-36" Ga.
6-Ton WESTGHE, 500 V., 904-B Mts., 44"-36" Ga.
5-Ton WESTGHE, 250 V., 902-B Mts., 56½" Ga.
4-Ton WESTGHE, 250 V., 902-C Mts., 36" Ga.
4-Ton GOODMAN, 250 V., 42-I Mts., 44"-40" Ga.

Each unit listed above is owned by us and
is available now for immediate purchase.

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Incorporated

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2—200 KW Westg. Syn. Motor Generator
Sets 600 V. D.C., Gen., connected to
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900 RPM. with exciters and controls.

5—50 H.P. G.E. unused slip ring Type
MTC Hoist & Crane Motors, 3/60/440
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driven Manistee Water Pump,
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Jeffrey: 10 ton, 500 volt, 44" gauge, 8 ton, 6 ton, and 4 ton, all gauges, 250 volt.

Goodman: All 250 volts—

1—6 ton, 33-1-4T, 44"
1—6 ton, 30B, 48" 1—5 ton.
1—5 ton, W-1-2, 36"

Westinghouse: All 250 volt.

1—4 ton, 902, 48" 1—13 ton, 102, 44"
1—904 c. 44" 500 volt.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE, COMPRESSORS * CAR RETARDERS * DUMPS
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G.E.: All 250 volt, 5 ton 825, 44"
6 ton 803, 44", as is 4 ton 1022, 44, as is
6 ton 823, 44" 8 ton 839, 44"

MINING MACHINES

Jeffrey, 35B, 35BB, 29B, and 4—28A 250
V. 2—29C with drop bar support.

Goodman, 12A, 12AB, 12AA, 12G3A, 124EJ.
1—212G3 250 volt and 2—112DA, 500 volt.
2—Permissible Type 12CA.

Sullivan, CE7, CE9, CE10, CR10 Low Vein
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SUBSTATIONS

275 volts, D.C.
1—200 KW West. M-G Set.
1—200 KW Ridgeway Converter.
100 KW West. Rotary Converter.
2—150 KW, 2—100 K Ridgeway M-G Sets.
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1—150 KW G.E. HCC Rotary Converter.

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Generator 452 Amps., 220-3-60. Extra
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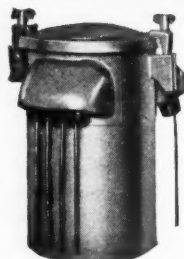
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Gen.)

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HP	Make	V.	Speed
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225	Ideal	440	900
1-175	Westgh.	2200	600
2-75	Westgh.	2200	900
75	Westgh.	220	1800

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150 KW Ridgeway 250 V.—2300 V. AC 900 RPM
1 PF
3-150 KW G.E. 550 v. DC 2200 v. AC 1200 RPM. 8 PF
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90 KW Al. Ch. 250 v. 2200 v. AC 900 RPM
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LOCOMOTIVES

5 Ton Jeffrey Storage Battery 42 to 44" Ga. 2 BB
motors, Battery box on top
6 Ton Whitcomb 250 v. 40" Ga.
1-4 1/2 Ton Westgh. 36" Ga. 250 v. with reel
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MINING MACHINES

12—CE 7 Sullivan DC Standard 30 HP

SLIP RING & SQ. CG. MOTORS (3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
700	G.E.	393	S.R.	MT 432
400	West.	500	S.C.	CS
200	West.	580	S.R.	CW
200	Cr. Wh.	440	S.R.	28
200	Al. Ch.	600	S.C.	
150	West.	720	S.C.	CS
125	Al. Ch.	435	S.R.	
100	F.M.	600	S.C.	BB
100	Lincoln	1200	S.C.	
75	West.	870	S.R.	CW752C
75	G.E.	690	S.R.	I M
75	West.	575	S.R.	CW868A

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30 HP Clyde sgl. drum AC Motor
25 HP Thomas sgl. drum AC Motor
15 HP Lidgerwood sgl. dr. AC Motor

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HP	Make	Speed	Type
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30	West.	600	SK
25	West.	875	SK
20	West.	900	SK-100L
15	West.	1200	SK
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42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

TRANSMISSION BELTING

HEAVY-DUTY
FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	6	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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HEAVY DUTY
RUBBER COVERED

Width	Ply	Top-Bottom	Covers
12"	6	1/16"	1/16"
14"	6	1/16"	1/16"
16"	6	1/16"	1/16"
18"	6	1/16"	1/16"

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1-200 KW West. 600 v., otherwise same
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1-150 KW West. 275 v. DC, same as above.
1-200 KW West. Rotary Converter, 275 v.
DC, 2300 v. AC.
1-100 KW West. same as above.

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1-10 ton Jeffrey, MH 110 250 v. motors.
1-10 ton, same as above with 500 v. motors.
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Established
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Mines in Pennsylvania Coal Fields
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American Cable **TRU-LAY** PREFORMED is the safest possible rope to use. Worn or broken crown wires lie flat and in place. No wicked barbs to tear hands. **TRU-LAY** resists kinking and whipping, too—thereby handling easier, faster, safer. And acknowledgedly—it lasts longer than non-preformed.

Specify American Cable **TRU-LAY** PREFORMED — the safer rope. All American Cable ropes identified by the Emerald Strand are made of Improved Plow Steel.

AMERICAN CABLE DIVISION • WILKES-BARRE, PENN.

District Offices: Atlanta, Chicago, Detroit, Denver, Los Angeles,
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AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT,
CONNECTICUT

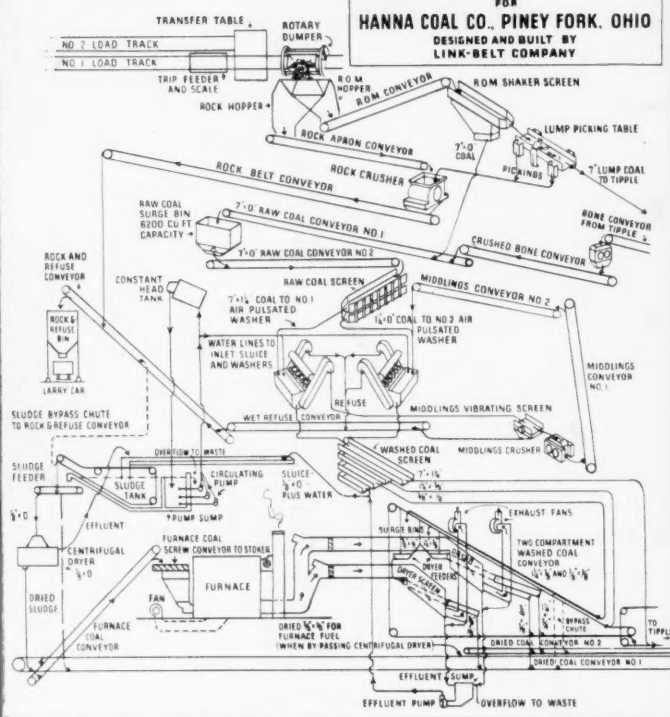


ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

With Hanna at Piney Fork

Their Newest LINK-BELT PLANT Provides Quality Production of All Sizes

FLOW SHEET—WASHING AND DRYING PLANT
FOR
HANNA COAL CO., PINEY FORK, OHIO
DESIGNED AND BUILT BY
LINK-BELT COMPANY



Hanna Coal Company—pioneer in the washing of Ohio coal—has again selected Link-Belt preparation equipment. This time it's Piney Fork—their third Link-Belt preparation plant now aiding in the war effort with full production. These modern facilities illustrated, embrace the dumping, conveying, washing, cleaning and drying of coal, 7" and under, and the hand-picking of larger lumps.

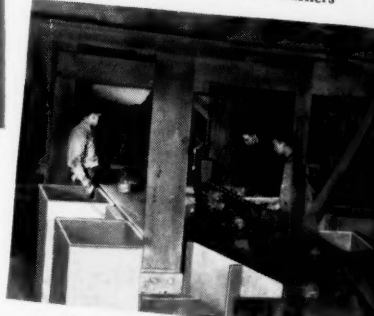
LINK-BELT COMPANY
Chicago, Philadelphia, Wilkes-Barre,
Pittsburgh, Cleveland, Huntington, W.
Va., Kansas City, Mo., Indianapolis,
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Vancouver. 8752

Two air-pulsated washers clean 7" x 1 1/4" and 1 1/4" x 3/4" x 0" respectively.

Another general view taken in front of dump house.



Raw coal conveyor to shaker screen which presizes feed to two washers



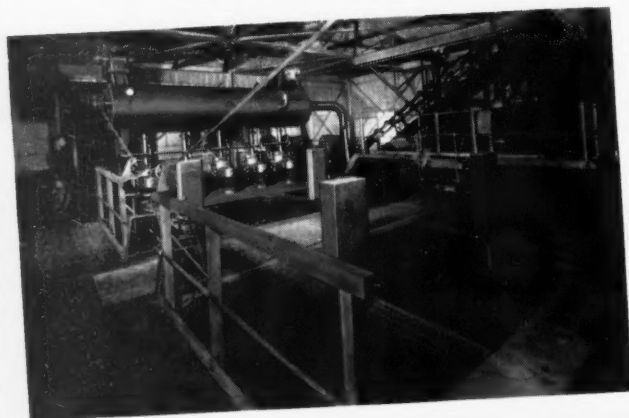
Picking table for plus 7" lump received from R.O.M. screen.



One of two screen-type heat dryers for 1 1/4" x 3/8" and 3/8" x 1/8" washed coal.



Rotary dumper. Transfer table permits single dumper to discharge cars arriving from two tracks.



LINK-BELT HANDLING PREPARATION EQUIPMENT